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THE EMOTIONAL TOLL OF COMBAT EXPERIENCE

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The war's end, nearly two years ago, should have settled finally the psychiatric problems of our twelve to fifteen million men who were in the military service between December 7, 1941, and August 15, 1945, if we were to accept the opinion of so many laymen, doctors, and even psychiatrists that psychiatric disabilities represented, for the most part, an effort to escape military service or combat, or to obtain or hold on to a pension.

With the popularization of psychiatric concepts and psychiatric lingo, all men have become specialists in the easy and glib dismissal of emotional illness as a method of conscious escape. On all sides we learn that men broke down in the combat areas to get sent to the rear, and that they stayed sick to be returned to the United States, then to be put on limited duty, then to get discharged, and finally to get pensions. For the "specialists" of this opinion, the explanation and understanding of the emotional disturbances precipitated by the war are very simple; but the facts are contrary to this easy dimissal of the problem. Evacuation to the rear, even after many of the "miracle cures" of narco-analysis and narco-synthesis, did not result in recovery, nor did evacuation to the states, or limited duty, or medical discharge, or the granting of a permanent pension. Men did not recover as they were expected to, nor were they able to make their adjustment to life as we had been so readily promised by some military men.

I would certainly be the last to want to make invalids of our war-ravaged veterans by sentimentalizing and exaggerating their emotional disabilities. I do, however, insist that they are entitled to understanding and patience that comes from a real knowledge of the nature of emotional disorders and their long-standing residuals. Let us admit and dismiss the fact that a small number of military personnel were malingerers and psychopaths. The number was truly small, and most of them were in service only a few months—long enough to have the slow military machinery grind out their medical discharges.

The vast number of military personnel saw the fight through from their induction to their discharge on points, or until they were given a medical discharge after service in combat areas or participation in combat itself. I would like to dispell the idea that ran rife throughout the war—that only men of poor background suffered emotional disability in the war. We weeded out the largest part of those poorly endowed men in our induction centers, and although some slipped through or were sadistically pushed in, the army and navy were constituted by a cross section of the above-average American citizenry. If the development of nervous or emotional disability was evidence of poor emotional endowment, then we must indict the whole of our population because abnormal emotional reactions of serious import were practically universal in combat troops.

Causes of Combat Fatigue

Millions of men were subjected to stresses and strains for which they had in no way been trained: separation from home; sepa-

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ration from women; exposure to tropical heat and terrifying tropical disease; long hours of boredom; uninteresting work; suppresion of individual ambition; hourly, daily, and month-long threat of death or ghastly injury. The men had no certainty of victory or termination of service, and felt hopeless about ever getting home. For many this period of stress lasted two to three years.

Immediate Effects of Combat Fatigue

The rank and file of men reacted to this situation with faithfulness to duty. Gradually but almost invariably, however, there developed a pathologic emotional state that involved not only their feelings, but their thinking and their body functions. At first they showed abnormal sensitivity to noises, exaggerated startle reaction, increased sweating, excessive flushing of the face, marked tremor, disturbed sleep, and often terrifying nightmares and combat dreams. Their mood showed increasing anxiety with uneasiness, and gradually increasing irritability, undue sensitiveness, pathologic homesickness, and deepening and increasing brooding depression. This mood would frequently alternate with periods of elation, undue enthusiasm, and even a silly or slaphappy feeling. Thinking and talking became slowed, concentration was difficult, weakness and fatigability appeared, and ambition, interest and pep disappeared. They became subjectively and even objectively confused, and developed intolerable restlessness. Sex function was almost universally disturbed, and this disturbance was often accompanied by violent emotional outbursts. The irritability and depression increased at times to the point of violent outbursts of rage; anxiety increased to terrifying constant fear or panic; and often the gloomy, brooding depression, fear, and anger were dramatized as an intolerable sense of guilt or were expressed in paranoid attitudes toward superiors, civilians, or tragically, even against a man's own family and loved ones.

The Ubiquity of Combat Fatigue

This emotional toll was collected not only from the men whose disability reached the degree of severity which made them no longer serviceable for military duty and resulted in their admission to the hospital as psychiatric patients, but from all the men in the combat zones. The conviction that this emotional syndrome was ubiquitous in combat troops was subjected to investigation by examining a large group of men who had been returned from the combat zones but who were then and were to continue in duty status. An opportunity to examine psychiatrically 750 naval personnel was made available. These were upper-rated pharmacist mates—unselected except in the sense that they had successfully been through combat and had high enough intelligence to be sent to an advanced school of training. These men had been out of the combat zone for periods varying from three months to two years, and yet two thirds of them had enough of the symptoms enumerated above to warrant a psychiatric diagnosis of so-called combat fatigue, war neurosis, or operational fatigue. It became evident that this universal abnormal picture was not the result of a desire to escape service—none of these men were trying to get on the sick list—but was due to illness that affected all men subjected to the frightful strains of a long, disastrous war. Further evidence was forthcoming that a desire to avoid service could not be the cause of this disability. We examined 100 men who had been wounded in combat and had recovered sufficiently to permit discharge or voluntary return to duty. Each man because of his injuries was entitled to discharge from military service on request without any disapprobation. Yet the percentage of men affected with the combat fatigue syndrome in this group was the same as in the group of uninjured men in duty status.

Continuing Effects of Combat Fatigue

When the war ended, all the predictions that the patients with combat fatigue would suddenly recover were tragically upset. The men continued in their same gloomy, rut-like depressive irritability, with the same hypochondriacal complaints, the same sex disturbances, the same attacks of fear and rage. Recovery, which had been slow in most cases, although rapid in others, continued in its own uninterrupted way.

From a close study of these emotional illnesses, it was the conviction of many of us that we were dealing with a type of disorder that arose in response to prolonged danger, boredom, and emotional deprivation; but that it would tend to heal spontaneously after variable periods of time, as do the emotional

disturbances of civilians in peacetime. Psychiatric knowledge told us that, although ultimate recovery could be predicted, the time required for recovery could not be. We knew that months and years were better measures of the time than days and weeks. We knew that depressive psychiatric reactions or anxiety states were profound disturbances which were not under voluntary control and could not be terminated by manipulation of the environment.

For those who wished to see the combat neurosis as something close to malingering, even if the euphemistic term "secondary gains" was employed, investigation of the facts is disappointing. I examined about 600 "well" returned veterans who were re-entering universities in the fall of 1946. Of those who had seen combat or had been in the combat areas, 40 per cent still showed symptoms of the combat fatigue syndrome, with depression, irritability, restlessness, general slowing of thinking and concentrating ability, headaches, anxiety attacks, disturbed sleep, tremor, and sweating. A much higher percentage reported that they had had the symptoms during the war but that they had slowly disappeared.

I have recently undertaken a survey of patients discharged from a naval hospital with a diagnosis of combat fatigue* during late 1944 and 1945. The results will be disappointing to those who felt that only discharge from the armed forces was necessary for such patients' recovery. Although the study is not completed, we have been able to get reports from about 100 of the patients. The percentage of recoveries is painfully small, while the percentage of continuing illness is painfully high.

Our records of cases examined for the veterans bureau show that a high percentage of veterans have persistent symptoms which are socially and personally disturbing, if not economically incapacitating.

I examined the consecutive records of examination of 200 men with combat duty discharged from the service, many of them on points (that is, without recognized medical disability at the time of discharge), and found that the symptoms of this emotional syndrome of fear, anger, and depression are still disturbingly frequent. Depression persists in 83 per cent of the cases, restlessness in 74 per cent, irritability and headaches in 65 per cent, startle reaction in 65 per cent, terrifying combat dreams in 48 per cent, sleep disturbances in 46 per cent, fear attacks in 42 per cent, and sex disturbances (lessened desire to impotence) in 32 per cent of the cases. These are men long since discharged from the service—many of them without pensions or with pensions so small that it is incredible that they could influence a man's behavior. Many of these men have not asked for pensions, but do want and need treatment and help.

For administrative medical purposes the diagnosis actually recorded was "psychoneurosis."

Conclusion

These men are entitled to a recognition of the fact that their depression—and sometimes elation, irritability, dissatisfaction, physical complaining, unreasonable attitudes, sleep difficulties, and inability to work at times are not due to plain cussedness or laziness, but are the results of emotional illness that all combat troops suffered in lesser or greater degree as the result of intolerable strain. It is the physician who can interpret these men to their families and communities, and this paper is presented in an effort to obtain, on behalf of these veterans of combat duty, the understanding and cooperation of every North Carolina doctor.

The family doctor as a psychosomatic physician. Psychosomatic is a new term, but it describes an approach to medicine as old as the art of healing itself. It is not a new specialty but is rather a point of view which applies to all aspects of medicine and surgery. It does not mean less study of the soma; it only means more study of the psyche. Its subject matter is founded on important advances in physical medicine as well as on the biologically oriented psychology of Freud, without whose epochal discoveries no work on psychosomatic medicine could be attempted. It is not a new discovery, but rather a reaffirmation of the ancient principle that the mind and the body are interactive and interdependent, a principle that has always guided the intelligent general practitioner. Indeed the traditional old family doctor very often was an excellent psychosomatic physician, although he never thought of himself as such. His patients usually were intimate friends, and he was familiar with their social situations, as well as with their psychologic and physical peculiarities. He was well aware that these factors were related to illness. As a science, psychosomatic medicine aims at discovering the precise nature of this relationship for the greater benefit of doctors and patients alike.—Edward Weiss: Psychosomatic Diagnosis, Am. Practitioner 1:156 (Nov.) 1946.

THERAPY OF TETANUS

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Tetanus remains a serious disease. Although its prevention is easy and is well understood, there were 615 deaths from tetanus in the United States in 1944—230 of these in children under 15 years of age[1]. No condition in medicine requires clearer clinical judgment and more careful management than tetanus. An understanding of the disease is essential to a rational plan of therapy.

Tetanus is caused by an exotoxin, tetanospasmin, formed by actively germinating spores of Bacillus tetani. In order for these spores to germinate and produce this toxin they must be introduced into tissue of lowered oxygen tension. The oxygen tension of tissue may be reduced by trauma, hemorrhage, necrosis, poor blood supply, the presence of a foreign body, or the presence of other organisms. The toxin is elaborated during an incubation period ranging from one day to several weeks[2], after which it is carried by the blood to all parts of the body. This toxin has a strong affinity for motor neurons and produces a hyperirritable nervous system which is responsible for the reflex convulsions. In addition to the changes in the central nervous system, there is damage to the myoneural junction of voluntary muscles which results in constant generalized muscle spasm. Thus the affected person suffers from basal rigidity of his voluntary muscles as well as from recurrent spasms of these same muscles in response to internal or external stimuli acting on the hyperirritable nervous system.

The severity of the disease depends upon the amount of toxin which is formed at the focus of infection and the amount which becomes fixed to the responsive tissue of the affected person.

The clinical manifestations of the disease vary from very mild to very severe. The basal rigidity may involve only a few muscles near the wound, or the entire voluntary musculature may be rigid. The hyperirritability of the nervous system may be so mild that generalized spasms, if any occur, are very slight; or the patient may die early from asphyxia due to a generalized convulsion. The disease may be very mild at first and suddenly become very severe, or may be very severe from the beginning. Although some few cases are mild and terminate in spontaneous recovery, no one can tell at the onset which cases will be serious; hence all cases should be treated early and adequately until convalescence is definitely established.

Circulating toxin can be neutralized by introducing antitoxin into the circulation, but there is no known way to dissociate toxin which has become fixed to nervous tissue; hence early diagnosis and prompt treatment are imperative.

Diagnosis

The patient should be disturbed as little as possible by diagnostic procedures. A fatal convulsion may be precipitated by a spinal puncture or even by a less painful procedure. Sedation may be necessary before an examination. I remember a 4-year-old child who had a severe convulsion on the way to the hospital. He was so apprehensive of strange nurses and doctors that, before I even approached the child, a sedative was given through a well lubricated catheter slipped into the rectum by the mother.

Perhaps the most important factor in making the diagnosis is to recall early that there is such a disease as tetanus. Typically, the patient complains of abdominal and back pain. He may or may not have trouble opening his mouth. There is a peculiar spastic gait as if he were walking on his heels. He may seem to be in high spirits and may have a sarcastic facies. There is a generalized muscle spasticity, and after a period of time generalized convulsions. Early, these generalized muscle spasms may look as if the patient were shivering. The patient is clear mentally and the temperature is normal or only slightly elevated. The blood count, spinal fluid examination, and other laboratory findings are normal. As the disease progresses, the rigidity becomes more marked, generalized spasms are more severe and frequent, and finally the temperature rises as the patient develops pneumonia or dies of asphyxia in a generalized tetanic convulsion.

Typical cases with marked symptoms are easy to diagnose. Once I made a diagnosis

Read before the Section on Pediatrics, Medical Society of the State of North Carolina, Virginia Beach, May 13, 1947.

1. Vital Statistics of the United States, United States Public Health Service, Part 1, p. 92, 1944.
2. Calvin, J. K.: Tetanus, in Brennemann's Practice of Pediatrics, Hagerstown, Maryland, W. F. Prior Company, 1945, vol. 2, ch. 27.

over the telephone; the patient was a 10-year-old boy in tetanic spasm, with no fever and a suppurating wound. In atypical, early, or mild cases the diagnosis can be very difficult. Meningitis, spider bites, heat cramps, emotional upsets, tetany, strychnine poisoning, hydrophobia, poliomyelitis, and encephalitis must be thought of in the differential diagnosis.

Treatment

Control of muscle spasm

The control of muscle spasm is of primary concern, not only to relieve the patient of his agonizing muscle cramps but to prevent asphyxia from severe convulsions and pneumonia from lack of aeration, and to lessen exhaustion. Unnecessary stimuli are to be avoided. The patient should be kept in a comfortable, quiet room free from sudden noises, drafts and visitors. A calm, resourceful nurse should be in constant attendance until convalescence is well established. Numerous sedatives have been tried, and often more than one drug is required during the disease. Avertin[3] is perhaps the most popular because it can be given rectally and can be safely used over a period of days, and because it gives a very prompt response. Another advantage is that the dosage can be varied easily as needed. I start with a dose of 25 or 50 mg. per kilogram of body weight, and then give additional doses of 5 to 25 mg. as they are needed. Experience is necesary to maintain the correct state of sedation so that respiratory movements are deep enough to prevent atelectasis and anoxia. It is very important to differentiate cyanosis due to generalized muscle spasm from respiratory obstruction due to retained secretions. It is better to give a fairly large dose of the sedative, get the correct level of sedation, and then maintain it. A few mild convulsions are preferable to oversedation. In a severe generalized convulsion, intravenous sedation may be required to prevent asphyxiation. Sodium amytal, 5 mg. per kilogram, may be given slowly by vein, as well as by mouth or intramuscularly if indicated. Chloral hydrate and other sedatives are used successfully by some clinicians.

In the search for a drug to control muscle spasm without producing the marked general depression of a sedative, curare appears, theoretically, to be ideal. As long ago as 1867, Demine in France reported 22 cases of tetanus treated with curare, with 8 recoveries. Progress in the use of curare was delayed by the limited supply and the uncertain potency of the drug. During the past few years the drug has become available and accurately standardized. Several reports on the successful use of curare in conjunction with other drugs have appeared in the literature. Experience shows that curare can effectively control muscle spasm in tetanus, and that it offers the advantage of a conscious patient, able to breathe and cough easily and in addition able to move, void, and defecate[4].

Because of the marked variations in the manifestations of tetanus and in the response to curare, the drug should be administered only under the close supervision of an experienced person. Continuous relaxation at or near the level of respiratory paralysis results in hemoconcentration and eventually leads to an irreversible state of shock. The drug may be given intermittently, either intramuscularly or intravenously, in amounts just sufficient to control spasm but not large enough to produce constant muscle relaxation. Bowers of Los Angeles, who has had wide experience in the treatment of tetanus, reports: "In the severest case, we are using Intocostrin for 2 or 3 days to cut down the severity of paroxysms. We have found that in the dosage of 0.68 units per pound of body weight at 6 to 8 hour intervals, there is no danger of respiratory failure with this drug."[5] While curare is being administered, facilities for endotracheal administration of oxygen and artificial respiration should be available[6].

Administration of antitoxin

After the correct state of sedation has been acquired and the patient has been settled in a comfortable environment with constant medical attention, then and only then should antitoxin be given. Every effort should be made to avoid serum reactions, because of the danger of producing convulsions. The usual history of allergic manifestations or previous serum injections should be obtained. Skin tests and ophthal-

3. Spaeth, R.: Tetanus, in Tice's Practice of Medicine, Hagerstown, Md., W. F. Prior Company, 1945, vol. 5, pp. 25-47.

4. Cullen, S. C. and Quinn, C. S.: The Use of Curare in the Treatment of Tetanus: Case Report, Surgery 14:256-260 (Aug.) 1943.

5. Bowers, A. G.: Personal communication.

6. West, R.: The Pharmacology and Therapeutics of Curare and Its Constituents, Proc. Roy. Soc. Med. 28:565-578 (March) 1935.

mic tests should be done in routine fashion. It is perhaps well to give atropine and adrenalin before the serum is administered. Allergic patients should receive the serum only intramuscularly, other patients either intramuscularly or intravenously. Intraspinal administration is of historic interest only[7], and should never be used.

There is great difference of opinion as to the correct dose of antitoxin. Although the use of doses larger than 60,000 units cannot be criticized severely, it is probably just additional expense and inconvenience to the patient. Spaeth[8] has demonstrated by titration methods that after a single dose of 60-000 units adequate antitoxin is present in the circulating blood for as long as four weeks. It would therefore seem wise to give the serum in one dose of 60,000 units. If given intravenously, it should be given slowly at room temperature and diluted in saline or glucose solution.

If the patient does not show satisfactory improvement, better control of muscle spasm is usually indicated[9], rather than more antitoxin. Sometimes during the stage of serum sickness muscle spasm may be increased, so that special nursing care should not be discontinued until this danger is passed.

Care of the wound

After the muscle spasm is under control and the antitoxin has been administered, then the wound which has allowed the introduction of the infection demands attention. Fully half of these wounds are healed, and often no one has any memory of the wound. That type of wound requires no care. Wounds which are still unhealed demand the same surgical care as if the patient did not have tetanus. Devitalized tissue should be excised, foreign bodies removed, and free drainage established. Experimental work shows that amputation of the affected extremity as soon as symptoms of tetanus appear does not influence the outcome of the disease. Hence mutilating surgery is definitely contraindicated. It is very important to remember that if surgery is required months later the patient must be protected by either antitoxin or toxoid.

7. Dietrich, H. F.: Tetanus in Childhood, with Special Reference to Treatment, Am. J. Dis. Child. 59:693-710 (April) 1940.
8. Spaeth, R.: Serum Therapy of Tetanus, Am. J. Dis. Child. 61:1146-1174 (June) 1941.
9. Albis, F. L.: Program of Treatment of Tetanus, Marquette M. Rev. 11:139-143 (June) 1946.

Supportive therapy

General supportive measures are important in tetanus, as it is a very exhausting disease. Because of the danger of aspiration of food given by mouth, all except the mildest cases require intravenous alimentation. Glucose in saline solution, amino acids, plasma, and sometimes blood transfusions are required to maintain the patient. Attention should be paid to oral hygiene, the removal of secretions in the pharynx, and care of the skin. Retention of urine and feces often is troublesome, and catheterization and enemas may be required.

Prevention and treatment of complications

Pneumonia is such a frequent complication that every precaution possible should be taken to prevent its development. The correct state of sedation to allow proper aeration of the lungs, the administration of oxygen and carbon dioxide at intervals to insure deep breathing, frequent changes of position, and removal of secretions from the pharynx are necessary. As these patients often perspire freely, avoidance of drafts and care of the skin are important to prevent chilling. Until the days of sulfonamides and penicillin, the above measures were often inadequate and a patient who would otherwise recover from tetanus would die of pneumonia. Now penicillin should be administered until the patient is definitely convalescing. Since penicillin has an inhibitory effect on the Bacillus tetani *in vitro*, it was hoped that this drug would favorably influence the course of the disease. Clinical studies[10] give no indication that this is true, however. Sulfonamide drugs are equally ineffective.

It is well to have an x-ray of the spine made before the patient leaves the hospital, as compression fractures of the dorsal vertebrae develop in some 20 per cent of the patients with tetanus during severe convulsions. These fractures respond to the usual orthopedic procedures.

Prophylaxis Against Future Attacks

It is important to remember to give tetanus toxoid to any patient who has had antitoxin, as the acquired sensitivity increases the danger of future serum therapy. Tetanus is not an immunizing disease in the human

10. Lewis, L.: Therapeutic Trial of Penicillin in Tetanus, Ann. Int. Med. 25:903-915 (Dec.) 1946.

being, and several cases of second attacks have been reported.

Discussion

A member: I would like to ask how often Dr. McLeod recommends repeating the booster doses of tetanus toxoid.

Dr. McLeod: Every two years.

A member: Have any instances been reported of tetanus occurring in people who have been immunized with tetanus toxoid?

Dr. McLeod: In **Lancet** the British give a full report of their experience with tetanus during World War II. Only 10 per cent of their forces were not actively immunized. Some 22 patients were not protected by active immunization. These men developed the disease during the first ten days after the wound. These failures may have been due to an overwhelming amount of toxin or to a defective response of the individual to toxoid.

The antitoxin level rises from the fifth day after the booster dose of toxoid to reach a peak about the tenth day. For this reason the British gave seriously injured patients antitoxin as well as a booster dose of toxoid.

Dr. C. R. Bugg (Raleigh): I remember hearing a report on the British soldiers who were caught at Dunkirk. Many of those men had no care of their wounds for a period of eight or ten days. The report stated that, even without booster doses, there wasn't a case of tetanus among the men who had been immunized with tetanus toxoid.

Dr. A. S. Root (Raleigh): Dr. McLeod's paper emphasizes the importance of immunizing children against tetanus. Two doses of tetanus alum-precipitated toxoid given a couple of months apart immunize a child probably for life against this disease. I am inclined to think that we pediatricians are not emphasizing the immunization of children against tetanus as much as we should.

Dr. K. B. Geddie (High Point): A report on orphanage children immunized against tetanus stated that even after five years the vast majority of the children had enough antitoxin in the blood to prevent tetanus. Although it is customary to give booster doses every two years, I believe that doses at less frequent intervals would still be effective.

Dr. D. E. Robinson (Burlington): I think it is particularly important to give tetanus toxoid to children who have shown allergic manifestations of any kind and who have had previous antitoxin. They are likely to have severe allergic reactions to repeated doses of antitoxin.

Dr. McLeod: There is considerable difference of opinion about when to give toxoid after recovery from a case of tetanus. Roman in France gives 2 cc. of toxoid with the first dose of antitoxin and repeats the toxoid three times at five-day intervals. Cooke of St. Louis tried this procedure, but felt that from the point of view of the laboratory it wasn't sound. Most authors prefer to wait about three months after the patient recovers from tetanus before giving toxoid.

Dr. J. C. Knox (Wilmington): Does the site of the wound make any difference in the mortality from tetanus?

Dr. McLeod: There is no difference in the incubation period and no difference in mortality, even with wounds on the face or scalp.

Over 200,000 disabled veterans of World War II were in educational institutions or job training on Jan. 31 under the Vocational Rehabilitation Act administered by Veterans Administration.

EXTRACTION OF METALLIC FOREIGN BODIES FROM THE FOOD AND AIR PASSAGES

With Special Reference to the Alnico Magnet and Triangulation Fluoroscopy

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CHARLOTTE

Chevalier Jackson, the pioneer in the extraction of foreign bodies from the food and air passages, was probably the first to use the aid of magnetism in this field[1]. He applied it to the chest wall to pull a bullet within reach of the bronchoscopic forceps. No further mention of the use of magnetism appears in the literature until Silber, Kaplan and Epstein[2] in 1944 employed the permanent Alnico magnet in removing a padlock from the stomach.

Since then, Equen[3] has improved and popularized this method of extracting magnetic foreign bodies from the stomach. His improvement consisted in adding a 12 F Levin tube as a cover for the metal stylet attached to the Alnico magnet. The distal or magnet end of the tubing was perforated to allow air to be pumped into the stomach by means of a hand bulb attached to the proximal end (fig. 1.) Air can thus be forced into the stomach, distending the walls and allowing easier manipulation of the magnet. Equen has also designed a smaller bronchoscopic magnet. The metal stylet of this instrument is merely covered with a small ureteral catheter. Insufflation of air is not necessary. Fluoroscopic guidance is required with the use of either magnet.

We have not had an opportunity as yet to use the bronchoscopic magnet. While I am not sure that it will materially improve the well-established methods of handling magnetic foreign bodies of the tracheobronchial

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From the Charlotte Eye, Ear, Nose and Throat Hospital.

1. Jackson, C.: A Bullet in the Lung; Bronchoscopic Removal with the Aid of Magnetic Fixation, J.A.M.A. 90:1272-3 (Apr. 21) 1928.
2. Silber, S., Kaplan, C. and Epstein, B. S.: The Use of a Permanent (Alnico) Magnet in the Peroral Removal of a Metallic Foreign Body from the Stomach, Ann. Otol., Rhin. & Laryng. 53:589-594 (Sept.) 1944.
3. Equen, M.: (a) A New Magnet for Foreign Bodies in the Food and Air Passages, J.A.M.A. 127:87-88 (Jan. 13) 1945; (b) The Alnico Magnet—An Aid to Bronchoscopy and Esophagoscopy, Ann. Otol., Rhinol. & Laryng. 54:178-182 (March) 1945; (c) Magnetic Removal of Foreign Bodies from the Food and Air Passages under Fluoroscopic Guidance, South. M. J. 38:245-246 (April) 1945.

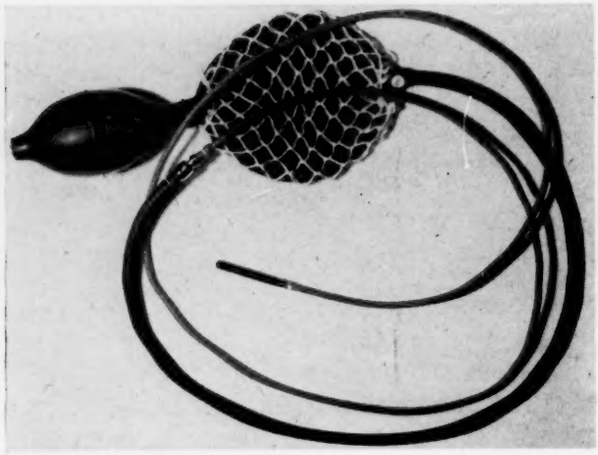

Fig. 1. Photograph of Alnico magnet apparatus as modified by Equen.

tree, I am keeping an open mind until I have had personal experience with its use.

The Hazard of Foreign Bodies in the Stomach

That the presence of the larger metallic foreign bodies in the stomach does carry a hazard is illustrated by this personal experience. A child, 2 years of age, was sent to me with a large nail in the stomach. This was in the early days of the Alnico magnet. I immediately called Dr. Equen, and he was good enough to send his magnet to me by air mail. In the short time which elapsed before its arrival, the nail became impacted in the duodenum.

I felt that the child should be given a chance to evacuate the nail spontaneously. For economic reasons, she was sent home under the observation of a very excellent general surgeon. The nail did not move appreciably, and was removed by abdominal section. Despite every care and large doses of chemotherapeutic agents, the child died. I am sure that her life would have been saved if the magnet had been available when the patient was first seen.

The Use of the Alnico Stomach Magnet

Many metallic foreign bodies in the stomach, even if large, will be uneventfully passed by older children. In our experience, however, if they are of any size at all, such objects are apt to hang at the pylorus or become impacted there in babies under 18 months of age. In this age group, any surgical procedure carries a large risk. Therefore, we welcome in the Alnico magnet a simple, safe method of removal, if we are fortunate enough to have a magnetic foreign body. The hazards of removal are greatly reduced. The patient is little taxed, and extraction as a rule is relatively simple and rapid. We have used no anesthesia. We have also found that neither biplane fluoroscopy nor triangulation fluoroscopy is required for the successful use of the magnet in the stomach. However, the usual bronchoscopic table and fluoroscope are necessary adjuncts for this procedure.

Case reports

The use of the Alnico magnet in the stomach is illustrated by the following case reports.

Case 1

Our first case was a 7-month-old baby who had swallowed an open safety pin about forty-eight hours before we saw him. X-ray examination (fig. 2) showed a medium-sized open safety pin in the stomach.

The child was placed on the bronchoscopic table in the x-ray room. No anesthesia was given. By means of a laryngoscope the Alnico stomach magnet was passed into the esophagus and then into the stomach. The stomach was gently inflated, and almost immediately contact was made with the safety pin, which proved to be magnetic. At first the keeper became attached to the magnet, so that the point was left up—an undesirable position. By rotating and moving the magnet, all under fluoroscopic guidance, we were able to manipulate the pin until the point was trailing. It was then gently pulled up into the esophagus. As was anticipated, it pulled off at the cricopharyngeus. A laryngoscope was then introduced, the larynx elevated, and the spring end of the pin brought into view. This was seized with ring forceps and extracted.

The baby has remained well since.

Case 2

A 15-month-old baby was seen two hours after the ingestion of an open safety pin. There was a humorous aspect to this case: The child had attended a party at which pastry diapers were served; each contained a safety pin!

A roentgenogram (fig. 3) showed a small, open, safety pin in the stomach. In spite of its small size, we thought it best to remove it, since the baby was only 15 months of age. A duplicate proved to be magnetic.

Prior to operation the child was given ⅛ grain of codeine and 1 grain of sodium luminal. The hypopharynx was exposed with a small spatula and the magnet was passed into the esophagus. Under fluoroscopic guidance, we were able to make contact with the pin. However, the point was up. Because of the small size of the pin, it was with considerable difficulty that we were able to reverse the point into a trailing position. The pin was then carefully drawn up into the esophagus. When the cricopharyngeus was approached, the spatula was reintroduced. With the tubing of the magnet through the spatula and the cricopharyngeus elevated so as to relieve spasm, the pin was then withdrawn with a trailing point.

There were no complications.

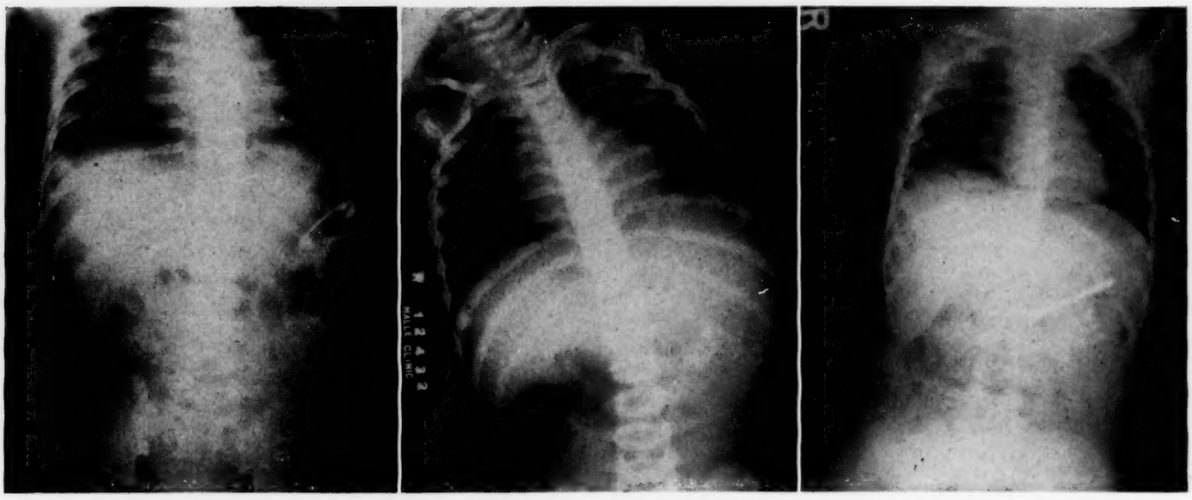

Fig. 2 (Case 1). Open safety pin in the stomach of a 7-month-old baby. Fig. 3 (Case 2). Open safety pin in the stomach of a baby 15 months of age. Fig. 4 (Case 4). Large nail in the stomach of a baby 15 months of age. All these foreign bodies were successfully extracted with the Alnico magnet.

Case 3

This baby was 2½ years of age and was seen four hours after swallowing an open safety pin. X-ray examination revealed a medium-sized open safety pin in the pyloric end of the stomach.

Without anesthesia, the magnet was passed through a laryngeal spatula into the esophagus. Under fluoroscopic guidance, and with some inflation, we were finally able to get the magnet into the pyloric end, where immediate contact with the pin was made. The pin proved to be magnetic and was drawn to the cardia, where the point presented. By rotating and shaking the magnet, however, we were able to reverse the point into a trailing position. The pin was then gently pulled upward. It came off either at the cricopharyngeus or in the mouth. A laryngeal spatula was immediately introduced. The pin was found lying in the hypopharynx with the spring end presenting. This end was seized with ring forceps and the pin was extracted.

The patient had an uneventful convalescence.

Case 4

A baby 2 years of age was seen two hours after swallowing a nail. The roentgenogram (fig. 4) showed a large nail in the stomach.

Following sedation with 1 grain of sodium luminal and ¼ grain of codeine, the hypopharynx was exposed with a spatula and the stomach magnet was introduced. By a little manipulation under fluoroscopic guidance, we were able to make contact with the head of the nail. The nail was withdrawn without difficulty, and proved to be about two inches in length.

The baby returned home in good condition shortly after the operation.

Case 5

This 4-year-old child was also seen two hours after the ingestion of a nail. An x-ray film (fig. 5) showed a slightly bent nail in the pylorus of the stomach.

Following the administration of 2 grains of sodium luminal and ¼ grain of codeine, the magnet was passed into the stomach with the help of a laryngeal spatula. Under fluoroscopic guidance, immediate contact was made with the head end of the nail, which had apparently been regurgitated higher into the stomach by vomiting. The nail was extracted without difficulty, and recovery was uneventful.

Case 6

A 3-year-old baby swallowed a bobby pin three hours before admission. X-ray examination (fig. 6) revealed a large bobby pin in the stomach.

The patient was given 2 grains of sodium luminal and ¼ grain of codeine, and was then taken to the x-ray room, where the whole procedure was done under fluoroscopic guidance. By means of a laryngeal spatula, the Alnico magnet was passed into the stomach. The stomach was then ballooned with air, and the bobby pin was immediately picked up in the long axis. We were thus able to extract it without difficulty. There were no complications.

Other Methods for Extracting Foreign Bodies from the Food Passages

Extraction through the esophagoscope

Since only 10 per cent of foreign bodies are magnetic[1], and since most safety pins are now made of plastic and are therefore inert, the older methods for extracting foreign bodies from the food passages must often be utilized. If the pin is one of the larger sizes, is in the esophagus, and is nonmagnetic, I prefer endogastric version through the esophagoscope. The keeper shank is straddled with ring forceps, so that a rigid and dangerous grip is avoided. The pin is taken with trailing point into the stomach, and there reversed by manipulation. Peroral extraction is then done with the point trailing.

In my opinion, however, the introduction of a rigid metal esophagoscope into the stomach is a risky procedure in an infant. If the foreign body is toward or in the pylorus, the instrument must be swung to the left by rotating the head to the left. This maneuver involves considerable pressure on

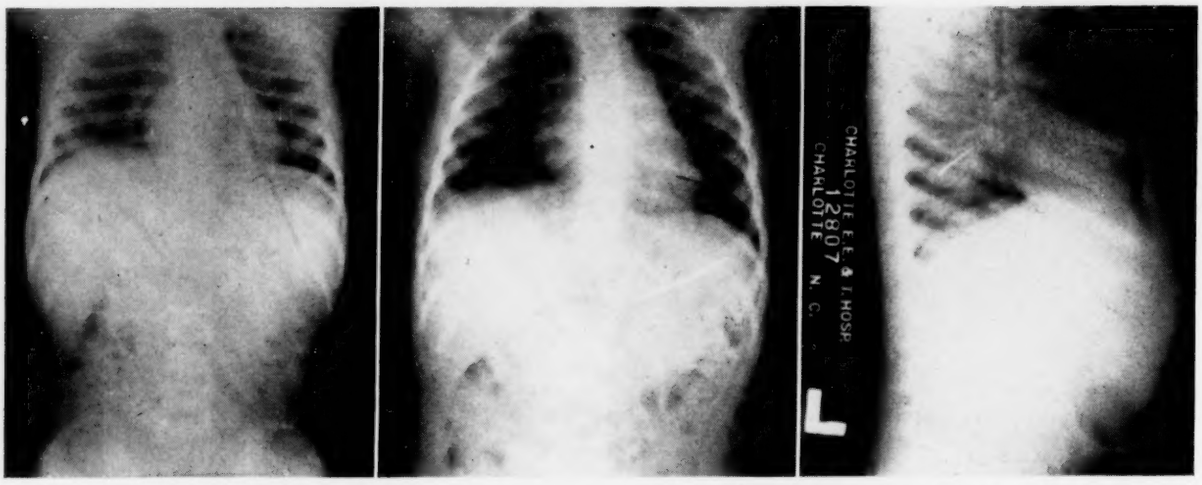

Fig. 5 (Case 5). A nail, with slightly bent head, in the pylorus of a 4-year-old child, lying immediately over and anterior to the spinal column. Extraction was done with the Alnico magnet. Fig. 6 (Case 6).A large bobby pin in the stomach of a 3-year-old baby. This was easily removed with the Alnico magnet. Fig. 7 (Case 8). This lateral film of a baby 2½ years of age shows a small bronchoscopic forceps blade in a posterior branch bronchus of the right lower lobe. This was beyond bronchoscopic vision, but was successfully removed with the aid of triangulation fluoroscopy.

the mediastinum, which is increased by the necessary inflation of the stomach by air. The only fatality I have ever had as the result of an attempt to remove a foreign body from the stomach followed such manipulation. Death was probably caused by bilateral spontaneous pneumothorax.

Surgery

Certain principles in the surgical removal of a foreign body from the stomach deserve emphasis. The incision should be quite small. If the surgeon can feel the foreign body through the stomach wall, he may be able to manipulate it externally to the opening and remove it. The foreign body is not always easily located, however, and endoscopic visualization through the incision may be necessary.

If undue difficulty is encountered in locating the object, it may be wise to do a gastrostomy rather than subject a baby to unnecessary shock. After two weeks, it is amazing how well babies will tolerate endoscopy through the gastrostomy opening. We use this retrograde method constantly in severe lye burns of the esophagus, to get a string through into the mouth. I have never resorted to gastrostomy for the removal of a foreign body, but I think it might be applicable and perhaps life-saving in some cases.

We may often save the life of even a small baby by good judgment and patience. We must remember that the thick-walled stomach may tolerate even a sharp foreign body for several weeks. The esophagus, on the other hand, is very thin-walled and easily perforated. Foreign bodies must therefore be removed early from the esophagus in order to prevent a mediastinitis. Should this eventuality occur, however, it should be remembered that surgical drainage of the upper mediastinum is now a well-standardized operation.

Another case report serves to illustrate the principles of treatment just discussed.

Case 7

A 6-month-old baby had had a large open safety pin in the esophagus for several days. There had been bleeding, and the patient was admitted with a fever of 103 F. In an attempt to do a version on the pin, it was lost in the stomach. The baby was too ill for further manipulation.

Since we were faced with an impending acute mediastinitis, neck drainage of the upper mediastinum was immediately done under general anesthesia. Although frank pus was not encountered, the temperature subsided and the baby's condition improved promptly. The pin remained in the stomach for several weeks, and was then successfully removed by a general surgeon. Uneventful convalescence followed.

The Use of Triangulation Fluoroscopy

Credit for the application of triangulation fluoroscopy to foreign body problems should go entirely to W. E. Roberts of our x-ray department. Since he has already published an article covering the details[4], my remarks on this subject will be brief.

Heretofore, biplane fluoroscopy has been used to visualize opaque foreign bodies be-

4. Roberts, W. E.: Direct Visual Guidance, Triangulation Roentgenoscopy for the Removal of Opaque Foreign Bodies. Am. J. Roentgenol. 52:327-331 (Sept.) 1944.

yond endoscopic vision. This method necessitated the use of two tubes and two screens. In triangulation fluoroscopy, two tubes and a single screen are used. Thus two foreign bodies and two pairs of forceps are seen by the roentgenologist. By their relationships, he can tell the bronchoscopist when the forceps are in the same plane as the foreign body both horizontally and vertically. He then directs seizure of the foreign body.

The use of this method can best be illustrated with a case report.

Case 8

A 2½-year-old child had had a nail removed from the right lung one week previously by a capable and experienced bronchoscopist. Unfortunately, in removing the nail, my colleague had broken a bronchoscopic forceps blade. This disappeared and could not be visualized by subsequent bronchoscopy. X-ray examination, however, showed the blade to be in the right lung. The patient was then referred to our clinic for further study and treatment.

After admission, additional x-rays were made in the posterior-anterior and lateral positions (fig. 7). These showed a small forceps blade, apparently in one of the posterior branches of the right lower lobe.

A tracheotomy had been done by the first surgeon. The baby was taken to the operating room, and without anesthesia a 3½ mm. bronchoscope was introduced through the tracheal opening. There was still some swelling in the lower right bronchus, and the subdivisions could not be well visualized. No foreign body was seen.

The special fluoroscopic and bronchoscopic apparatus was then prepared in the x-ray department. The patient was given a hypodermic containing 1 grain of sodium luminal and ¼ grain of codeine sulfate. The child was then placed in the proper position and a 3½-mm. bronchoscope was again introduced through the tracheal wound without anesthesia. Using triangulation fluoroscopy, we were able to identify the correct bronchus, and after working about one-half hour were able to seize the broken piece. The first seizure was too near the mid-portion, however, and the foreign body could not be safely withdrawn. It was then released and reseized near the end and withdrawn. It proved to be one whole blade as indicated in the x-ray.

The patient was dismissed the following day in good condition.

Summary

Some of the newer methods employed in the endoscopic removal of foreign bodies of the food and air passages have been briefly reviewed. Particular emphasis was given to the use of the Alnico magnet in extracting magnetic foreign bodies from the stomach. Six cases in which this method was successfully employed were described. The objects removed included three open safety pins, two nails, and one bobby pin.

The use of triangulation fluoroscopy as developed in our clinic was also described briefly. This method is especially applicable to small opaque foreign bodies in branch bronchi beyond bronchoscopic vision. One illustrative case was reported.

RECENT ADVANCES IN THE TREATMENT OF CARDIOVASCULAR DISEASE

EDWARD S. ORGAIN, M.D.

DURHAM

Two years ago the recent and most important advances in the treatment of cardiovascular disease were surveyed[1]. Since this report was published, significant progress has been achieved, many hopes have been fulfilled, and a few radical changes in our ideas of therapy have been made. It is proposed now to present a brief review of some of the newer concepts in which the greatest contemporary interest has been manifest.

Bed Rest

In recent years much attention has been drawn to the inadvisability of prolonged bed rest in the treatment of both medical and surgical conditions. The deleterious effects of bed rest in congestive heart failure and myocardial infarction have been emphasized, particularly by Harrison, Levine, and Dock[2]. There is little doubt that the patient with congestive heart failure is more comfortable in a large bed with the head elevated, or in a large easy chair provided with arm rests, than in any other position. In myocardial infarction the period of bed rest has now been reduced in most instances from two months to four to six weeks. Shorter periods of bed rest are endured more easily, thromboembolic phenomena are decreased, and no harm accrues to the patient.

More recently consideration has been given to the importance of early ambulation

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1. Orgain, E. S.: Recent Advances in the Treatment of Cardiovascular Disease, North Carolina M. J. 6:3-27 (June) 1945.

2. (a) Harrison, T. R.: Abuse of Rest as a Therapeutic Measure for Patients with Cardiovascular Disease, J.A.M.A. 125:1075-1077 (Aug. 19) 1944; (b) Levine, S. A.: Some Harmful Effects of Recumbency in the Treatment of Heart Disease, J.A.M.A. 126:80-84 (Sept. 9) 1944; (c) Dock, W.: The Evil Sequelae of Complete Bed Rest, J.A.M.A. 125:1083-1085 (Aug. 19) 1944; (d) Aagaard, G. N. and Watson, C. J.: The Restriction of Activity in Coronary Occlusion with Particular Reference to the Extent of Myocardial Infarction, M. Clin. North America 29:405-416 (March) 1945.

in rheumatic fever and of physical reconditioning after the subsidence of the infection[3], in order to prevent neuroses, principally of the anxiety type, and to forestall physical invalidism.

Treatment of Ectopic Rhythm Disturbances

For the treatment of ectopic rhythm disturbances, quinidine[4] is unquestionably the most useful single drug. The newly reported development of a method for determining the plasma concentration of quinidine[5] should aid materially in adjusting dosage schedules and in insuring more uniform and desirable results. Askey[6] has challenged the accepted belief that quinidine is contraindicated in auricular fibrillation associated with congestive heart failure. Collective statistics reveal that the risk of eventual embolism is 15 to 20 per cent in patients with untreated auricular fibrillation and only 4 per cent when quinidine is used therapeutically. The risk of sudden death is, however, slightly higher for patients receiving quinidine in the presence of heart failure than for untreated patients. Askey advocates an attempt to restore normal rhythm, particularly in those desperately sick individuals whose auricular fibrillation and failure continue uncontrolled by the standard medical procedures, including complete digitalization.

The recent literature contains a number of reports on the use of various drugs for the control of ectopic rhythm disturbances—for example, lanatoside C in paroxysmal tachycardia[7] and auricular flutter[8], prostigmine in combination with mecholyl[9], potassium acetate in auricular fibrillation[10], quinidine[11] and magnesium sulfate[12] in ventricular tachycardia, paredrine hydrobromide[13], and finally intravenous procaine[14] for arrhythmias arising during anesthesia. Although mercury, in its various forms, is the most potent diuretic available when given intravenously, Batterman, de Graff, and their associates[15] have shown also that it may be safe and effective when given orally. An appreciation of the toxic effects of the mercurial diuretics is demonstrated by several recent communications[16]. Pines[17] and his associates have made the important suggestion that magnesium sulfate be added to the mercurial diuretic, if it is to be given intravenously, both to prevent fatalities and to enhance the diuretic effect of the drug.

Treatment of Congestive Heart Failure

Digitalis remains the most effective single therapeutic agent in the treatment of congestive heart failure[18]. While in general the oral administration of the whole-leaf digitalis in tablet form is satisfactory and effective, well deserved interest has been aroused in the isolation and practical application of

3. (a) Karpovich, P. V., Starr, M. P., Kimbro, R. W., Stoll, C. G., and Weiss, R. A.: Physical Reconditioning after Rheumatic Fever, J.A.M.A. 130:1198-1203 (April 27) 1946; (b) Robertson, H. F., Schmidt, R. E. and Feiring, W.: The Therapeutic Value of Early Physical Activity in Rheumatic Fever: Preliminary Report, Am. J. M. Sc. 211:67-73 (Jan.) 1946.
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5. Delevett, A. F. and Poindexter, C. A.: Plasma Concentrations of Quinidine with Particular Reference to Therapeutically Effective Levels in Two Cases of Paroxysmal Nodal Tachycardia, Am. Heart J. 32:697-703 (Dec.) 1946.
6. Askey, J. M.: Quinidine in the Treatment of Auricular Fibrillation in Association with Congestive Failure, Ann. Int. Med. 24:371-384 (March) 1946.
7. Tandowsky, R. M.: Prophylactic Use of Lanatoside C in Auricular Paroxysmal Arrhythmias, Am. Heart J. 29:71-77 (Jan.) 1945.
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10. Eichert, H.: Potassium Acetate Therapy in Paroxysmal Auricular Fibrillation, U. S. Nav. M. Bull. 46:405-411 (March) 1946.
11. (a) Zimmerman, S. L.: Ventricular Tachycardia—A Report of Ten Cases, Eight of Which Were Treated with Quinidine with Recovery in Seven, Ann. Int. Med. 23: 634-651 (Oct.) 1945.
    (b) Freundlich, J.: Paroxysmal Ventricular Tachycardia, Am. Heart J. 31:557-564 (May) 1946.
12. Zimdahl, W. T.: Magnesium Sulfate in Paroxysmal Tachycardia, Ann. Int. Med. 25:531-533 (Sept.) 1946.
13. Griffith, G. C.: Use of Paredrine Hydrobromide: Para-hydroxy-a-Methyl-Phenyl-Ethylamine Hydrobromide in Control of Cardiac Arrhythmias with a Review of the Literature, U. S. Nav. M. Bull. 44:284-299 (Feb.) 1945.
14. Burnstein, C.: Treatment of Acute Arrhythmias during Anesthesia by Intravenous Procaine, Anesthesiol. 7:113-121 (March) 1946.
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17. Pines, I., Sanabria, A., and Arriens, R. T.: Mercurial Diuretics: The Addition of Magnesium Sulphate to Prevent the Toxic Effects of Their Intravenous Administration, Brit. Heart J. 6:197-213 (Oct.) 1944.
18. Broome, R. A., Jr., and Orgain, E. S.: The Practical Use of Digitalis, North Carolina Med. J. 7:3-8 (Jan.) 1946.

the cardiac glycosides[19], which in essence are the potent active principles of digitalis leaf. The development of these purified preparations for clinical use represents the most significant advance in digitalis therapy. The digitalis glycosides have distinct advantages over digitalis leaf in that they may be assayed gravimetrically rather than biologically and thus may be prescribed accurately in terms of weight of the drug rather than by "cat" or "digitalis units." An additional advantage is that oral and intravenous digitalization may be accomplished more rapidly than with digitalis leaf.

The most important member of this group of cardiac glycosides is digitoxin, which has a potency 1,000 times that of digitalis; 0.1 mg. of digitoxin is equivalent in potency to 0.1 Gm. of digitalis. It is the only member of the digitalis group that is completely absorbed when given orally, so that the dosage required for complete digitalization is identical whether the drug be administered orally or intravenously. While the entire digitalizing dose (average dose 1.2 mg.) may be exhibited as a single dose with little evidence of intoxication[20], it is preferable to divide the dose into two equal portions given six hours apart. The daily maintenance dose varies from 0.1 to 0.2 mg. Because digitoxin is excreted slowly, the conversion from intravenous administration to oral maintenance may be accomplished without difficulty.

While considerable research has been devoted to a number of other cardiac glycosides[21]—digilanid, digoxin, and Strophanthin K—, the physician should familiarize himself with two additional preparations which have proved valuable for rapid intravenous digitalization. Ouabain (crystalline G-Strophanthin) is inert when given orally, but when administered intravenously it exerts initial effects in ten to twenty minutes and maximal effects in two hours. The disadvantage of this preparation lies in its rapid excretion; some other type of digitalis must be used for maintenance purposes. Similarly lanatoside C is useful intravenously because of its rapid action, the full effect being reached in about four hours; it too, however, is rapidly excreted, and a transfer to other digitalis preparations is advisable for maintenance purposes.

Recent studies of fluid dynamics in congestive heart failure[22] have served to modify radically former opinions concerning the importance of diet and fluid intake in those patients exhibiting edema[23]. It is now agreed and accepted that the most important item in the dietary regimen is the content of sodium, for an excess of sodium salts leads to fluid retention. Sodium retention occurs in congestive heart failure, presumably as the result of inadequate blood flow through the kidney. When the sodium in the diet is maintained at very low levels (0.5 to 1 Gm. per day), fluid restriction becomes unnecessary and irrational, because large amounts of fluid are easily tolerated by the patient. It is common experience that thirst is produced when fluids are restricted to less than 1500 cc. per day; on the other hand, abdominal discomfort arises when the oral intake of fluids exceeds 3000 cc. per day. It seems judicious to allow a "free fluid intake," so that 1700 to 2500 cc. of fluid will be ingested per day. This amount will insure adequate urinary excretion.

A more radical concept in the dietary management of edema has been offered by

19. (a) Gold, H.: The Treatment of Cardiac Failure with Digitalis Glycosides, Mod. Concepts of Cardiovasc. Dis., 14, No. 11 (Nov.) 1945; (b) Broome, R. A., Jr. and Orgain, E. S.: The Cardiac Glycosides, North Carolina M. J. 7:61-65 (Feb.) 1946; (c) Gold, H.: Pharmacologic Basis of Cardiac Therapy, J.A.M.A. 132:547-554 (Nov. 9) 1946; (d) Freedberg, A. S. and Zoll, P. M.: Medical Progress: Digitalis, New England J. Med. 235:938-945 (Dec. 26) 1946; (e) DeGraff, A. C.: Clinical Comparison of the Cardiac Glycosides, New York State J. Med. 46:1803-1809 (Aug. 15) 1946; (f) Warren, E. W. and Findley, T.: Recent Advances in Pharmacology, M. Clin. North America 29:417-444 (March) 1945; (g) Vander Veer, J. B.: The Choice and Method of Administration of Digitalis Glycoside Preparations, M. Clin. North America 30:1263-1274 (Nov.) 1946.

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23. (a) Bridges, W. C., Wheeler, E. O. and White, P. D.: Low-Sodium Diet and Free Fluid Intake in the Treatment of Congestive Heart Failure, New England J. Med. 234:573-578 (May 2) 1946; (b) Wheeler, E. O., Bridges, W. C. and White, P. D.: Diet Low in Salt (Sodium) in Congestive Heart Failure, J.A.M.A. 133:16-20 (Jan. 4) 1947; (c) Leevy, C. M., Strazza, J. A. and Jaffin, A. E.: Fluids in Congestive Heart Failure, J.A.M.A. 131:1120-1125 (Aug. 3) 1946; (d) Reichsman, F. and Grant, H.: Some Observations on the Pathogenesis of Edema in Cardiac Failure, Am. Heart J. 32:438-442 (Oct.) 1946; (e) Clark, T. W.: Diet and Diuretics in the Treatment of Congestive Heart Failure, M. Clin. North America 30:1286-1300 (Nov.) 1946; (f) Grant, H. and Reichsman, F.: The Effects of the Ingestion of Large Amounts of Sodium Chloride on the Arterial and Venous Pressures of Normal Subjects, Am. Heart J. 32:704-712 (Dec.) 1946.

Schemm[24], who proposes a slightly acid-ash diet, supplemented by ammonium chloride and hydrochloric acid, as well as a forced-fluid regimen in which 3000 to 8000 cc. per day are given both orally and parenterally. The rationale of this method of treatment is based upon the fact that an acidifying program favors the excretion of sodium through the kidneys and that water itself is a useful and potent diuretic. While this dietary and acidifying regimen enjoys extended use now, the forced-fluid regimen has not been accepted very generally.

Treatment of Rheumatic Fever

During the past several years much work has been done in the field of rheumatic fever. In spite of a considerable amount of research, the etiology of rheumatic fever remains obscure. Evidence has been presented, however, to indicate that hypersensitivity[25] may well underlie the pathology of rheumatic fever. There is now fairly general agreement[26] that sensitivity to group A hemolytic streptococci represents the important prelude to the development of rheumatic fever. Heredity and environment[27] are other important factors. It has been demonstrated that the sulfonamide drugs will prevent respiratory infections due to hemolytic streptococci, and thus decrease recurrences of rheumatic fever in susceptible subjects[28].

The appearance of sulfonamide-resistant strains of streptococci has been the inevitable result of widespread suppressive prophylaxis[29]. It has been established that the sulfonamide drugs, as well as penicillin, have no value in the treatment of the acute phase of rheumatic fever; moreover, either drug actually may aggravate the infection.

Following the suggestion of Coburn[30] with reference to the use of large doses of salicylates in order to suppress the allergic and inflammatory manifestations of rheumatic fever and thus decrease the amount and severity of resulting cardiac damage, much work has been done[31]. It would appear to be the consensus that large-dose salicylate therapy is of value in controlling the exudative phenomena of the acute attack, but that such therapy has little influence in forestalling the progress of the disease process or in preventing the subsequent development of cardiac damage. No significant advantage is gained by the intravenous use of the drug, except for more rapid action initially. Sodium bicarbonate should be administered in moderate doses concomitantly with the salicylates. Intoxication[32] from the salicylates is a frequent sequel to large-dose therapy. Of interest are the recent observations[33] that hyaluronidase derived from hemolytic streptococci will increase the diffusion of a

24. Schemm, F. R.: A High Fluid Intake in the Management of Edema, Especially Cardiac Edema. I. The Details and Basis of the Regime, Ann. Int. Med. 17:952-969 (Dec.) 1942; II. Clinical Observations and Data, Ann. Int. Med. 21:937-976 (Dec.) 1944.

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dye injected intradermally and that salicylate will inhibit this action by at least 50 per cent. This finding suggests that the action of the salicylates upon the exudative phenomena of rheumatic fever is more specific than was appreciated formerly. The clinical demonstration that para-aminobenzoic acid[34] administered simultaneously with salicylates will increase the concentration of the latter drug in the blood indicates its possible utility in those instances where inadequate salicylate concentrations are attained after large-dose therapy.

Since the sedimentation rate[35] may be decreased specifically by salicylate treatment, it is of less value than the Weltmann reaction[36] as an index of activity of the rheumatic infection.

In the event of salicylate sensitivity or failure, acceptable substitutes are available in the forms of aminopyrine and certain succinate derivatives[37].

Penicillin

In bacterial endocarditis

The greatest current achievement in the medical treatment of heart disease has been the practical application of penicillin to the therapy of bacterial endocarditis. This disease, considered ten years ago to be almost universally fatal, was cured during the ensuing few years by various types of sulfonamide therapy in only 5.5 per cent of a large series of patients. Since 1944, the prognosis for bacterial endocarditis has been completely altered by antibiotic therapy. A review of most of the larger series of reported cases[38] reveals that, of a total of 507 patients treated by penicillin, 342 or 67 per cent have recovered. The recovery rate after the administration of penicillin alone was 64 per cent (264 of 412 patients), while that following supplementary anticoagulant therapy in the form of heparin or dicoumarol was 68 per cent (65 of 95 patients). The addition of the anticoagulant, therefore, has not significantly altered the final therapeutic results. The dangers[38a,39] inherent in its use are sufficiently great to suggest its re-

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linquishment.

The various techniques of administration of penicillin have not demonstrated any individual superiority; with the use of continuous intravenous drip 67 per cent recovered (155 of 230 patients), with continuous intramuscular drip 58 per cent recovered (7 of 12 patients), with intermittent intramuscular injection at one- to three-hour intervals 66 per cent recovered (132 of 201 patients), and with varied combinations of the above types 73 per cent recovered (48 of 64 patients). The disadvantages of each method must be appreciated, and the patient's comfort should be the deciding factor in selecting and altering the mode of administration. The daily dosage of penicillin is, however, of paramount importance and depends to a large extent upon the sensitivity of the organism to the drug. Preliminary *in vitro* sensitivity tests therefore should be performed in each instance where laboratory assistance is available. Recoveries are reported following the administration of penicillin in daily doses varying from as little as 40,000 units to as high as 10,000,000 units[38g,u;40a]. Where the offending organism has been sensitive, 200,000 to 500,000 units of penicillin per day generally have sufficed to provide cure; but when the organism has been resistant, a million or more units per day have been required. It has been suggested[38b,p] that the penicillin level in the blood be maintained at four to ten times the *in vitro* sensitivity level. If adequate concentrations cannot be attained with penicillin alone, the concomitant administration of para-aminohippurate[40] may aid in reaching the desired level. In view of the availability and low cost of penicillin at present, it seems reasonable to recommend that each patient with bacterial endocarditis be given at least 500,000 units per day, and if the organism reveals resistance *in vitro*, not less than 1,000,000 units per day. There is incomplete agreement upon the duration of treatment. Advised schedules have differed between extremes of two weeks and two months, with general opinion favoring an intermediate course of four to six weeks of treatment, depending upon the total response of the patient. The fact that the infecting bacteria may become increasingly resistant to penicillin must not be forgotten in the initial plan of the daily as well as the total dosage of the drug.

In cardiovascular syphilis

Insufficient time has elapsed to evaluate the therapeutic efficiency of penicillin in the treatment of cardiovascular syphilis[41], although this antibiotic has been shown to be effective in the treatment of primary and secondary lues as well as of neurosyphilis. Great caution should be exercised in its use for syphilis of the vascular system, since it may give rise to therapeutic shock of the Herxheimer type, similar to that following arsphenamine.

Treatment of Coronary Artery Disease

During the past several years little of practical value has been added to the therapy of coronary artery disease[42]. The sedatives, xanthines, and nitrites, along with restricted activity, continue as the most popular measures in the therapy of angina pectoris. While papaverine is effective in coronary thrombosis[43] with myocardial infarction, it has little effect upon angina pectoris. When given intravenously it is potentially fatal[44]. Similarly it should be emphasized that aminophyllin[45] given intravenously may cause severe shock-like reactions and even death, particularly in patients with myocardial infarction or congestive heart failure. The introduction of the anti-thyroid drugs, such as thiouracil, very naturally suggested their use in decreasing the metabolic demands made upon the heart by the tissues in the hope of reducing the pain of angina pectoris by a

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"chemical thyroidectomy." While enthusiastic reports of results have been published by some[46], it is felt by others[47] that these drugs will be useful principally in the treatment of those patient exhibiting initially elevated metabolisms. Nicotinic acid[48], which possesses vasodilating properties, is valueless in controlling the pain of coronary insufficiency. Additional experiences with testosterone[49] have revealed its potentialities in relieving chest pain associated with the male climacterium, but its value in the treatment of angina pectoris is debatable. While cobra venom[50] will control temporarily the pain of coronary insufficiency and increase the patient's ability to exercise, it has no effect upon the evidence of coronary insufficiency which can be demonstrated electrocardiographically by a standard exercise test. The controversy regarding the use of digitalis[51] in patients with myocardial infarction remains unsettled. From personal experiences, I believe that when congestive heart failure supervenes as a complication, digitalis is indicated. Caution must be observed, however, since the myocardium is made more irritable by virtue of the acute muscle degeneration.

A new and probably valuable asset in the therapy of coronary thrombosis with myocardial infarction is the practical development of anticoagulant therapy[52] in the form of heparin and dicoumarol. Interest in these drugs has centered about their value in acute arterial and venous thrombosis and the accepfed clinical fact that thrombo-embolic phenomena[53] are common following coronary thrombosis with infarction. Since dicoumarol may be administered orally over prolonged periods at low cost, it has been the drug of choice. Observations reported by Wright[54], Peters and his associates[55], and Nichol and Page[56] indicate that the incidence of thrombo-embolic phenomena following coronary thrombosis has been reduced as compared with previous reported statistics. No large series of control cases untreated by dicoumarol has been followed concurrently, but the preliminary results have been sufficiently encouraging to warrant further extensive trials of the anticoagulant drugs. Because dicoumarol requires about forty-eight hours for its effect to become manifest, heparin may be used for an immediate response. A preparation of heparin[57] for subcutaneous use, possessing rapid and relatively prolonged action, is now available. No recent experiences have been reported with reference to those surgical procedures designed to increase the blood flow to heart muscle, such as cardiomyopexy, cardio-omentopexy, and cardiopericardiopexy. A new method for the treatment of coronary disease, however, has been proposed by Fauteux[58]—pericoronary neurectomy combined with ligation of the great cardiac vein. This procedure is designed to interrupt surgically all afferent pain fibers arising from the myocardium and coronary arteries, as well as to increase the blood supply to the myocardium. The number of patients who have been submitted to this operative technique is too few to permit the formulation

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of an opinion regarding its ultimate usefulness.

Treatment of Hypertension

Since the ingenious demonstrations of Goldblatt and his associates that hypertension can be produced in the experimental animal by renal ischemia, an enormous amount of investigative work has been devoted to the determination of the underlying mechanisms and of their possible relationship to primary or essential hypertension in man[59]. The renal pressor system which can be demonstrated in the hypertensive experimental animal has not been shown to exist in human hypertension. It is the consensus at present that these experimental observations do not explain or solve the problem of the pathogenesis of human "essential" hypertension[60]. As Smith[61] has pointed out, "So far as the genesis of essential hypertension is concerned, the kidney appears to be the victim rather than the culprit."

By drugs

The continued search for kidney extracts capable of reducing human hypertension has proved fruitless[62]. No new and practical drugs have been advanced for the treatment of hypertension. The thiocyanate[63] drugs remain the most popular ones in general use, along with other conservative measures. Toxic manifestations of the thiocyanate series should be fully appreciated, since fatal poisoning[64] may ensue. Recently thrombophlebitis[65] as well as hypothyroidism and mild myxedema[66] resulting from thiocyanate administration have been reported in the literature. The use of hesperidin[67] and rutin[68] is of possible value in the control of capillary fragility and capillary hemorrhage in hypertension. The new drugs, tetraethylammonium bromide and chloride[69], which produce blockade of the autonomic ganglia in man are of limited value in hypertension, since their effects are quite transient. The principal benefit to be derived is a momentary reduction of blood pressure in the acute hypertensive state.

By diet

Further experiences with the use of the rice regimen are noted by Kempner[70], who reports that approximately 62 per cent of patients with essential hypertension are improved by this high-carbohydrate, low-protein, low-fat, salt-free diet with restriction of fluids. Grollman and his associates[71] have reported the efficacy of sodium restriction in the diet of a small group of hypertensive patients. The rationale underlying such regimens is not clearly established, and further investigation with respect to the underlying pathologic physiology[72] is indicated. The results of irradiation of the pituitary gland in a series of 92 hypertensive patients who exhibited positive blood tests for antidiuretic substances are reported by Pendergrass[73] and his associates. Approximately 50 per cent manifested definite improvement in their clinical condition and blood pressure.

The statistics of Levy, Hillman, Stroud, and White[74] emphasize quite clearly the necessity for careful follow-up of all indi-

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70. Kempner, W.: (a) Compensation of Renal Metabolic Dysfunction: Treatment of Kidney Disease and Hypertensive Vascular Disease with Rice Diet, III, North Carolina M. J. 6:1-72 (Feb.) 1945; (b) Some Effects of the Rice Diet Treatment of Kidney Disease and Hypertension, Bull. New York Acad. Med. 22:358-370 (July) 1946.
71. Grollman, A., Harrison, T. R., Mason, M. F., Baxter, J., Crampton, J. and Reichsman, F.: Sodium Restriction in the Diet for Hypertension, J.A.M.A. 129:533-537 (Oct. 20) 1945.
72. Perera, G. A. and Blood, D. W.: Disturbance in Salt and Water Metabolism in Hypertension, Am. J. Med. 1:602-606 (Dec.) 1946.
73. Pendergrass, E. P., Griffith, J. Q., Jr., Padis, N., and Barden, R. P.: The Indications for Irradiation of the Pituitary Gland in Patients with Arterial Hypertension, Am. J. M. Sc. 213:192-197 (Feb.) 1947.

viduals exhibiting transient elevation in blood pressure, since sustained hypertension develops more frequently in the patient with transient hypertension than in the normotensive individual.

By surgery

Increasing interest has been manifested in the surgical treatment of hypertension. The main objective of surgery has been the abolition of vasoconstrictor tone of the peripheral arterioles by surgical interruption of the efferent nervous pathways mediated through the sympathetic nervous system. Recent observations of the results of such surgical treatment have been reported by Peet[75], Smithwick[76], de Takats and his associates[77], Poppen and Lemmon[78], Palmer[79], and Grimson[80]. Peet employs a supradiaphragmatic splanchnicectomy and lower dorsal ganglionectomy in which there is bilateral removal of the tenth, eleventh, and twelfth thoracic sympathetic ganglia, the lesser splanchnic nerves, and 9 to 13 cm. of the greater splanchnic nerves. Since 1933, Peet states, 1500 patients have been subjected to this operative procedure. In his initial report satisfactory results were given as better than 50 per cent. In a more recent communication results in a series of 437 patients followed for periods varying from five to twelve years are reported. Of these, 251 patients are living five to eleven years after operation. Of those living 81.3 per cent have a satisfactory lowering of blood pressure (20.3 per cent to normal); 12.7 per cent are unchanged; and in 6 per cent the blood pressure has actually increased. During this period 186 patients died (35.2 per cent). Of the total series, 46.7 per cent obtained a satisfactory result at the end of the five-year follow-up period. Of the patients who succumbed, 49 per cent had malignant hypertension.

The Smithwick technique embodies a more extensive transdiaphragmatic splanchnicectomy and lumbo-dorsal sympathectomy which at most involves removal of the sixth dorsal through the third lumbar ganglia, inclusive, but usually includes only the eighth dorsal through the first or second lumbar ganglia. In a six-year period over 600 unselected patients were submitted to this operation, with a total mortality of 7.8 per cent. The operative mortality was 2.2 per cent, deaths within one year 2 per cent, and deaths one or more years after operation 3.6 per cent. Smithwick reports that 60 per cent of the group are significantly improved; in 42 per cent the diastolic blood pressure was lowered 30 mm. of mercury or more, and in 18 per cent the diastolic pressure was lowered 20 to 29 mm. of mercury. Of doubtful significance is a third group of 20 per cent in which the blood pressure was lowered 10 to 19 mm. of mercury. It is to be noted that these figures refer only to changes in the diastolic pressure level in the horizontal position following operation. Surprisingly enough, no close correlation was observed between the postoperative effect upon the blood pressure and the grade of renal arteriolar damage measured from renal biopsy specimens taken at the time of operation. Smithwick concludes that an adequate surgical procedure upon the autonomic nervous system is of definite therapeutic value in the management of hypertension. That the effect of sympathectomy on the blood pressure is not dependent upon a simple non-specific surgical procedure[81] has been demonstrated by comparative statistics. While he suspects that the operative result is due to decrease in muscle tone and thereby in peripheral resistance, it is not known whether this decrease is due to a modification of neurogenic vasoconstriction or to a change in a humoral mechanism as yet unknown.

74. (a) Levy, R. L., White, P. D., Stroud, W. D., and Hillman, C. C.: Transient Hypertension. The Relative Prognostic Importance of Various Systolic and Diastolic Levels, J.A.M.A. 128:1059-1061 (Aug. 11) 1945; (b) Levy, R. L., Hillman, C. C., Stroud, W. D. and White, P. D.: Transient Hypertension: Its Significance in Terms of Later Development of Sustained Hypertension and Cardiovascular-Renal Diseases, J.A.M.A. 126:829-833 (Nov. 25) 1944.
75. (a) Peet, M. M. and Isberg, E. M.: The Surgical Treatment of Arterial Hypertension, J.A.M.A. 130:467-473 (Feb. 23) 1946; (b) Peet, M. M.: Results of Bilateral Supradiaphragmatic Splanchnicectomy for Arterial Hypertension, New England J. Med. 236:270-277 (Feb. 20) 1947.
76. Smithwick, R. H.: (a) Surgical Treatment of Hypertension: The Effect of Radical (Lumbodorsal) Splanchnicectomy on the Hypertensive State of One Hundred and Fifty-Six Patients Followed One to Five Years, Arch. Surg. 49:180-193 (Sept.) 1944; (b) Experiences with the Surgical Treatment of Essential Hypertensive Cardiovascular Disease in Man, Cleveland Clin. Quart. 12:105-117 (Oct.) 1945; (c) Surgical Treatment of Hypertension: Some Circumstances Under Which Lumbodorsal Splanchnicectomy Appears to be Inadvisable in Hypertensive Patients, New York State J. Med. 44:2693-2700 (Dec. 15) 1944.
77. de Takats, G., Graupner, G. W., Fowler, E. F., and Jensik, R. J.: Surgical Approach to Hypertension: Second Report, Arch. Surg. 53:111-163 (Aug.) 1946.
78. Poppen, J. L. and Lemmon, C.: The Surgical Treatment of Essential Hypertension, J.A.M.A. 134:1-9 (May 3) 1947.
79. Palmer, R. S.: Medical Evaluation of the Surgical Treatment of Hypertension, J.A.M.A. 134:9-14 (May 3) 1947.
80. Grimson, K. S.: The Surgical Treatment of Hypertension, In Press.
81. Rojas, F., Smithwick, R. H. and White, P. D.: Nonspecific Major Operations and Lumbodorsal Sympathectomy, J.A.M.A. 126:15-17 (Sept. 2) 1944.

Other authors[77-79] have reported satisfactory results using principally the Smithwick procedure.

The Grimson operation of near-total to total paravertebral sympathectomy, involving removal of the stellate ganglia, the thoracic chain, the celiac ganglia, and the first and second lumbar ganglia, represents the most extensive of all reported techniques. Satisfactory results have been obtained in 70 per cent of 77 cases thus far summarized, but complete follow-up studies of the entire group of cases are not yet available. The results in a small series of cases in which the extent of sympathetic denervation was decreased by a modified technique, comparable to that of Smithwick, have been far less satisfactory.

It is difficult to compare the results of operative procedures at present because of the varying standards used in the selection and classification of patients initially and the different criteria for postoperative results. The problem of selecting patients suitable for operation remains of paramount importance, and no definite rules as yet may be stated with confidence. Methods are not available which will determine with accuracy and assurance the benefits to be derived from surgery of the sympathetic system. It is agreed, however, that one should be hesitant about suggesting operation for the patient with hypertension who is over 50 years of age or who has significant disease of the three vital tissues affected most commonly by hypertension—namely, the heart, kidneys, and brain; for with more advanced disease of these structures the mortality rises and the probability of benefit becomes limited. While at this stage of our knowledge no final recommendation can be made with regard to the best type of procedure for all patients, we agree with Grimson that "the lowering of the blood pressure has been directly proportional to the extent of the sympathectomy and inversely proportional to the severity of the disease."

In spite of the infrequency with which unilateral disease of the kidney is the direct cause of hypertension, occasional reports[82] are still presented of good results obtained by unilateral nephrectomy in appropriate instances.

82. (a) Rath, M. M. and Russek, H. I.: Urologic Disease as a Cause of Hypertension, Am. Heart J. 29:516-525 (April) 1945; (b) Kittredge, W. E. and Brown, H. G.: The Present Status of Unilateral Renal Hypertension, J. Urol. 55:213-219 (March) 1946; (c) Ratliff, R. K., Nesbit, R. M., Plumb, R. T., and Bohne, W.: Nephrectomy for Hypertension with Unilateral Renal Disease: Report of Forty-Nine Cases, J.A.M.A. 133:296-299 (Feb. 1) 1947.

Surgical Treatment of Congenital Cardiac Defects

During the past ten years surgery in general has provided many new approaches to the cure of disease. From the cardiovascular standpoint the results of techniques devised for the treatment of certain congenital defects have been spectacular indeed. The three congenital defects of the heart for which surgical correction is now available are patency of the ductus arteriosus, coarctation of the aorta, and the tetralogy of Fallot. To Gross[83], Blalock and Taussig[84], and Crafoord and Nylin[85], whose intelligence, skill, and courage pioneered these achievements, we must express our profound admiration as well as our gratitude.

Patent ductus arteriosus

The first congenital heart lesion for which cure by surgery was accomplished is that of patent ductus arteriosus. To Gross[83] must go the credit for the first successful ligation, accomplished in 1939. Since his initial paper was published, many other successful operations have been recorded. The importance of the condition lies in the fact that after the age of 17 the life span may be shortened by twenty-five years, and of 60 autopsied cases reported by Keys and Shapiro[86], 41.7 per cent died of bacterial endocarditis and 28.3 per cent of congestive heart failure. Shapiro[87] has reported recently the results of the surgical treatment of this condition in 643 patients by forty-six different surgeons. In 17 instances an error in diagnosis was made. Of the remaining 626 patients, 431 were treated by various types of ligation. Of these, 343

83. Gross, R. E. and Hubbard, J. P.: Surgical Ligation of a Patent Ductus Arteriosus: Report of First Successful Case, J.A.M.A. 112:729-731 (Feb. 25) 1939.

84. (a) Blalock, A. and Park, E. A.: The Surgical Treatment of Experimental Coarctation (Atresia) of the Aorta, Ann. Surg. 119:445-456 (March) 1944; (b) Blalock, A. and Taussig, H. B.: The Surgical Treatment of Malformations of the Heart in Which There is Pulmonary Stenosis or Pulmonary Atresia, J.A.M.A. 128:189-202 (May 19) 1945.

85. Crafoord, C. and Nylin, G.: Congenital Coarctation of the Aorta and Its Surgical Treatment, J. Thoracic Surg. 14:347-361 (Oct.) 1945.

86. (a) Shapiro, M. J. and Keys, A.: The Prognosis of Untreated Patent Ductus Arteriosus and the Results of Surgical Intervention: A Clinical Series of 50 Cases and An Analysis of 139 Operations, Am. J. M. Sc. 206:174-183 (Aug.) 1943; (b) Keys, A. and Shapiro, M. J.: Patency of the Ductus Arteriosus in Adults, Am. Heart J. 25:158-186 (Feb.) 1943.

87. Shapiro, M. J.: Recent Advances in Surgical Treatment of Patent Ductus Arteriosus, Mod. Concepts of Cardiovasc. Dis., Vol. 16, No. 1 (Jan.) 1947.

were uninfected, and the mortality rate was 4.9 per cent. In the remaining 88 patients, who had superimposed endarteritis, the mortality rate was 28.4 per cent. Recanalization occurred subsequently in 30, or 8.7 per cent, of the 343 patients with uninfected ducts, and in 4.5 per cent of the 88 patients with infected ducts. This report represents a distinct advance, in that the mortality has been reduced from its initial level of 8 per cent to the predicted mortality of 5 per cent with improvements in methods, experience, and skill. It is suggested that recanalization will develop in about 10 per cent of the cases following ligation.

Of the 626 patients who were submitted to operation, 195 had section of the duct. Of these, 182 were uninfected, and there was 1 death from hemorrhage in this group. Of 13 patients with complicating bacterial endarteritis, 2 died, although section was performed successfully in one of these cases. It is suggested that section should be done whenever possible; but if this is not feasible, ligation should be performed.

In view of the fact that cardiac efficiency is greatly impaired by the existence of a patent ductus arteriosus and that surgical cure can be effected with a minimal fatality rate in the hands of a skilled surgeon[88], it now seems wise to submit all patients with this condition for operation at a suitable time. This implies that all children should be operated upon, irrespective of physical or mental retardation or evidence of cardiac embarrassment. There is incomplete agreement regarding the treatment of the infected case[89]. It has been demonstrated that bacterial endarteritis may be cured by ligation without chemotherapy. In view of the danger that the duct may be made more friable by inflammation, however, conservative therapy with the antibiotic drugs should be carried out first, operation being postponed to a later and more favorable date. Patients who fail to respond to chemotherapy still may be submitted to operation. The diagnosis of patent ductus arteriosus can be made with ease when the typical signs of a machinery murmur, increased pulse pressure, and a prominent pulmonary artery are present. It would seem unwise to operate on those patients in whom only a systolic murmur is audible over the pulmonary conus, even though an occasional one may have a patent ductus. Gross considers the optimal age for operation to lie between 3 and 16 years[90]. His own cases have ranged in age from 11 months to 47 years.

88. Gross, R. E.: Present Day Surgical Treatment of the Patent Ductus Arteriosus, Bull. New England M. Center 7:171-175 (Aug.) 1945.
89. Vesell, H. and Kross, I.: Patent Ductus Arteriosus with Subacute Bacterial Endarteritis: Diagnosis and Indications for Operation, Arch. Int. Med. 77:659-677 (June) 1946.

Coarctation of the aorta

The second congenital condition for which surgical cure is available is that of coarctation of the aorta, a condition seen infrequently in young children and adults, and characterized by hypertension in the upper extremities and a lower systolic pressure in the lower extremities[91]. The importance of the condition lies in its prognosis. The average age at death is approximately 35 years, and although the lesion may occasionally be compatible with long life, 60 per cent of the patients die before the forty-first year. Initial experiments revealed the feasibility of excising segments of the aorta and performing end-to-end anastomosis[92] without injury to the experimental animal. The first successful operations on 2 patients were performed in October, 1944, by Crafoord and Nylin[85].

Gross[93] has reported recently his experiences with 16 patients who have been operated upon for coarctation of the aorta. In 2 patients the strictured area could not be excised. In 11 patients the constricted area of the aorta was removed with anastomosis of the remaining ends, and in each instance hypertension in the upper extremities was completely relieved. There were fatalities in 2 additional patients, one from the premature release of the constrictor clamps, and the other presumably from rupture of the suture lines in a patient aged 30 who had marked sclerosis of the aorta, rendering it unsuitable for satisfactory suture. In another patient the area of anastomosis was unsatisfactory, and an adequate lumen could not be established.

Gross has suggested that the optimal age

90. Gross, R. E.: Personal communication.
91. Reifenstein, G. H., Levine, S. A. and Gross, R. E.: Coarctation of the Aorta. A Review of 104 Autopsied Cases of the "Adult Type", 2 Years of Age or Older, Am. Heart J. 33:146-168 (Feb.) 1947.
92. Gross, R. E. and Hufnagel, C. A.: Coarctation of the Aorta: Experimental Studies Regarding Its Surgical Correction, New England J. Med. 233:287-293 (Sept. 6) 1945.
93. Gross, R. E.: (a) Surgical Correction for Coarctation of Aorta, Surgery 18:673-678 (Dec.) 1945; (b) Technical Considerations in Surgical Therapy for Coarctation of the Aorta, Surgery 20:1-8 (July) 1946; (c) Surgical Treatment for Coarctation of the Aorta, Mod. Concepts Cardiovasc. Dis., Vol. 16, No. 2 (Feb.) 1947.

for the operation lies between 6 and 20 years. Beyond the age of 20 to 25 years arteriosclerosis renders the aorta unsuitable for manipulation and suture, and it is predicted that the surgical mortality will probably be forbiddingly high. Younger patients have sufficient elasticity of the aorta to permit the operative procedure to be performed with a reasonably low surgical risk. In view of the poor prognosis of the disease ultimately, it seems acceptable that most, if not all, young patients in whom the diagnosis of coarctation of the aorta can be established satisfactorily should be submitted to surgery. Untreated patients succumb to bacterial endocarditis, rupture of the aorta, congestive heart failure, and cerebral hemorrhage[91].

Pulmonary stenosis

The third congenital cardiac lesion for which operation offers important amelioration, but not cure, is that of pulmonary stenosis or atresia with reduction in the pulmonary blood flow. To Blalock and Taussig[84b,94] must go the credit for the creation and clinical application of an artificial arterial ductus to improve pulmonary arterial blood flow. This operation generally consists in the end-to-end anastomosis of a subclavian artery or of the innominate artery to one of the branches of the pulmonary artery, the latter depending upon whether the aortic arch descends upon the right or the left. By means of this procedure the degree of oxygen saturation of the arterial blood may rise as much as 50 per cent during the several months following operation. In view of the common occurrence of a dextroposed aorta overriding an interventricular septal defect, arterial saturation would not be expected to reach a normal level, even though the operation is completely successful. The congenital abnormalities which may be benefited by this operation are the tetralogy of Fallot (pulmonary stenosis, dextroposition of the aorta, interventricular septal defect, and right ventricular hypertrophy), pulmonary atresia with or without dextroposition of the aorta and with or without defective development of the right ventricle, truncus arteriosus with bronchial arteries, and a single ventricle with a rudimentary outlet chamber in which the pulmonary artery is diminutive in size.

In his latest report Blalock[94d] states that he has now operated upon 243 patients who were thought to have the tetralogy of Fallot. The overall mortality rate, including deaths among those on whom an anastomosis could not be performed, those in whom the diagnosis was in error, and those who have died since leaving the hospital, was 21 per cent. The mortality rate in the second 100 patients was 15 per cent. In those patients (147) in whom an anastomosis between the end of a subclavian artery and the side of a pulmonary artery was performed, the mortality rate was 9 per cent. On the other hand, the mortality rate among those in whom the carotid or innominate artery was used (57) was 33 per cent. It seems pertinent to state that the operative mortality may have been influenced by the necessity for early operation in those patients who were in the poorest condition. As Blalock pointed out, 20 or more patients died while awaiting admission to the hospital for operation. While the patients have ranged in age from 4 months to 26 years, the preferable age for operation is given as 3 to 10 years.

Insufficient time has yet elapsed to allow a final evaluation of the late effects of an artificial patent ductus. The heart has consistently enlarged in the several months following operation, but the size apparently has remained unchanged after one year. Blalock has stated that cardiac enlargement after the first several weeks is not progressive, and that thus far streptococcus viridans infections have not developed. As a result of surgical technique and skill, no instances of empyema or mediastinitis have been encountered.

An additional report has been made by Potts[95] and others of 3 instances in which the pulmonary artery was anastomosed to the aorta. In 2 patients the results were striking; one fatality was encountered. According to Blalock the preferable operation at the present moment would seem to be the

94. Blalock, A.: (a) Physiopathology and Surgical Treatment of Congenital Cardiovascular Defects, Bull. New York Acad. Med. 22:57-80 (Feb.) 1946; (b) Effects of an Artificial Ductus Arteriosus on Experimental Cyanosis and Anoxemia, Arch. Surg. 52:247-252 (March) 1946; (c) The Surgical Treatment of Congenital Pulmonic Stenosis, Ann. Surg. 124:879-887 (Nov.) 1946; (d) The Use of Shunt or By-Pass Operations in the Treatment of Certain Circulatory Disorders, Including Portal Hypertension and Pulmonic Stenosis, Ann. Surg. 125:129-141 (Feb.) 1947.

95. Potts, W. J., Smith, S. and Gibson, S.: Anastomosis of the Aorta to a Pulmonary Artery, Certain Types in Congenital Heart Disease, J.A.M.A. 132:627-631 (Nov. 16) 1946.

anastomosis of the subclavian artery, provided it is large enough, to a branch of the pulmonary artery. The right subclavian is preferred to the left, in view of the angulation of the left subclavian artery as it arises from the aorta and its possible kinking after anastomosis with the left pulmonary arterial branch.

Unquestionably this operative procedure offers temporary amelioration and is a life-saving surgical procedure for those young patients with cyanosis due to congenital heart disease of specific types. It is agreed that the operation is not justified in those patients exhibiting adequate pulmonary blood flow—for example, patients with the tetralogy of Eisenmenger. We await with interest the late effects of the creation of an artificial arteriovenous fistula. In spite of the obvious temporary improvement it is to be expected that, as in a congenital patent ductus arteriosus, the effects of left ventricular strain due to an increased cardiac output may become manifest over a period of years long after the creation of an artificial ductus.

APOPLEXY OF THE ABDOMINAL WALL

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Charlotte

It is not within the scope of this paper to deal with abdominal hemorrhage in general. This discussion will confine itself to hemorrhage of the anterior abdominal wall, occurring in the rectus sheath.

Spontaneous hemorrhage into the rectus abdominis muscle is rather rare, but it has been reported some three hundred times. It is likely that many times that number of cases have been recognized but not reported, and that many small hemorrhages have gone unrecognized. Rupture of the muscle fibers, with rupture of the superior or inferior deep epigastric vessels, may involve any portion of the rectus; the weakest part of the muscle —that below the semilunar fold of Douglas, where there is no posterior rectus sheath— is most liable to this accident. The absence of this sheath at the lower third of the muscle contributes to the muscle weakness. Since the peritoneum is in direct contact with the muscle in this area, a collection of 50 to 2,000 cc. of blood will exert pressure against the peritoneum in proportion to the size of the hemorrhage.

Etiology

The cause of rupture in many cases can not be determined. The following etiologic classification suggested by Hilgenreiner[1] appears most satisfactory:

1. Traumatic—occurring chiefly in young, robust men of sound physical condition
   a. Direct violence
   b. Indirect violence.
2. Spontaneous—occurring in muscles weakened or atrophic from local or systemic disease
   a. Infections—for example, typhoid or influenza
   b. Pregnancy, labor, or puerperium
   c. Arteriosclerosis or associated disease.

It is generally agreed that rupture follows some muscular effort, although in some cases the effort has been so slight or so usual as to have left no impression on the patient's mind. A large percentage of cases follow severe exertion, such as that of athletic contests, heavy lifting, or sudden muscular effort. A number of cases occurred in soldiers while they were being put through their paces, especially when scaling a wall. Rupture may follow a cough or sneeze.

The most common symptom is pain over the site of the hemorrhage. The pain is in proportion to the extent of damage to the muscle and the size of the hematoma. Since extraperitoneal bleeding causes essentially the same peritoneal irritation as does intraperitoneal bleeding, nausea and vomiting are not uncommon symptoms. The patient is usually apprehensive, and there is often a picture of shock and its attending phenomena, depending on the degree of rupture and hemorrhage.

Tenderness and rigidity over the site of injury may be extreme. An indefinite mass is often seen and felt, and the area adjacent to the mass has a tenderness or rigidity. This important diagnostic sign, together with the fact that the mass is always located over the rectus muscle, helps to exclude intra-abdominal conditions. A hemorrhage may be so large as to force the peritoneum down in the pelvis, so that the mass can be palpated on rectal or vaginal examination.

The diagnosis is difficult, and many, if not most, of these patients have been subjected

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1. Hilgenreiner, H.: Spontaneous Hematoma in Abdominal Wall in the Elderly, Beitr. z. klin Chir. 129:700-710, 1923.

to abdominal operation, with a mistaken diagnosis of some acute intra-abdominal condition such as acute appendicitis, twisted ovarian cyst, ruptured ectopic pregnancy, incarcerated hernia, volvulus, intussusception, mesenteric thrombosis, perforated peptic ulcer, or gallbladder disease.

As in other diagnostic problems, the history is of utmost importance. A history of sudden pain closely related to muscular effort, or of direct trauma to the abdomen and the appearance of a mass over the rectus muscle should strongly suggest the diagnosis. In patients with infectious fevers and advanced systemic diseases, the history of a severe coughing spell preceding the sudden onset of abdominal pain and the appearance of a mass should make one suspect that the mass is intramural, rather than intraperitoneal.

The cases in which no mass develops are more difficult of diagnosis. It is well to remember that the pathologic changes are confined to the rectus sheath, and that the tender mass will not extend beyond its limits. Exceptions to this rule are the cases in which the hematoma points intra-abdominally; even in these cases, however, there is no relation to the pelvic organs, and the history should indicate the correct diagnosis. It is worth remembering that the symptoms are usually not intense and that they may be days in developing.

Surgery is not always necessary in these cases. If a large mass or hematoma develops, however, it should be evacuated, the vessels ligated, and the ruptured muscle sutured. Unless the diagnosis is reasonably well established, any patient with acute symptoms should have the benefit of operation. There is danger of overlooking some acute intra-abdominal condition in which immediate operation is necessary to save the patient's life.

Case Reports

Case 1[2]

A colored man, 18 years of age, was admitted to the Good Samaritan Hospital in 1927 with a history suggestive of appendicitis. A tender mass was present over his right rectus. At operation a hematoma and ruptured rectus muscle fibers were found. A normal appendix was removed. Following the operation, the patient gave a history of having been in a fight the day before and being hit in the lower abdomen.

2. This report is made entirely from memory, as I have been unable to find the patient's record in the hospital's files or my own.

Case 2

A 63-year-old spinster, a patient of Dr. L. B. Newell, was admitted to Mercy Hospital on September 16, 1944, complaining of pain low in the right side of the abdomen. Three days before, while lifting a heavy washtub, she felt acute pain in the lower right quadrant of the abdomen. She was able to continue her work, but the pain never entirely cleared up. Twenty-four hours before admission she felt another acute stabbing pain in the same area. She became nauseated, but did not vomit. At the time of admission she had eaten very little since the first attack. She complained of dizziness.

Her past history was entirely negative, and she had been generally in good health.

On examination the patient appeared somewhat anemic and underweight, and was somewhat apprehensive and nervous. There was no abnormality about the head and neck, and the heart and lungs showed no evidence of disease. The abdomen was slightly distended and there was a suggestion of a mass, or rather a fullness, over the lower part of the right rectus. Moderate tenderness and rigidity were noted over this mass and over the lower right side generally, and there was slight tenderness on the left (referred). No tenderness was elicited in the lower abdomen. The vaginal examination was negative. The blood pressure was 130 systolic, 75 diastolic; the temperature was 99.6 F., the pulse 95, respiration 22.

There were 3,200,000 red blood cells, a hemoglobin of 65 per cent, and 14,000 white cells, with 78 per cent polymorphonuclears, 20 per cent lymphocytes, and 2 per cent mononuclears. The urinalysis was essentially negative.

The preoperative diagnosis was acute appendicitis. Under general ether anesthesia a right pararectus incision was made. On opening the anterior sheath of the rectus, which was discolored, dark blood clots and free, bright blood were seen, with extensive transverse rupture and separation of the rectus muscle. The ends were fragmented and friable. There was also an irregular rupture of the peritoneum large enough to admit the exploring hand. The pelvis was full of blood clots. After removing the blood and clots, further exploration revealed, much to my surprise, an acutely inflamed appendix. It was removed.

When the injury had been repaired and closure of the incision was started, I found that, in addition to the longitudinal incision in the skin, there were two radiating, transverse separations in the skin at the lower angle of the incision, one extending inward one and one-half inches, the other, opposite, extending outward the distance of one inch. Since I had not intentionally made these arms to the incision, they were evidently tears which occurred as a result of exploring and removing the blood clots. I found further, on taking hold of the skin, that with only a slight pull it would tear as readily as wet blotting paper. The tear was like a clean cut, however, rather than ragged, as would be a tear in a wet blotter. Bits of skin and muscle were removed for section.

The pathologic report by Dr. W. M. Summerville was as follows:

"Specimen 1 consists of a small piece of skin, a piece of muscle, and a large blood clot. Sections show fibrous, fatty and muscle tissue with considerable hemorrhage. Sections through the skin show no unusual findings.

"Specimen 2 consists of an appendix measuring 5.2 x 0.7 cm. with a thickened, deeply injected wall. This appendix shows a diffuse leukocytosis and an exudate in the lumen. Diagnosis: Acute diffuse ap-

pendicitis."

The patient reacted well, had an uneventful convalescence, and was about ready to be dismissed from the hospital. While up in a chair on the thirteenth day she began to complain of acute pain in both sides of her chest, with dyspnea. She was cyanosed and had rales at both lung bases. She gradually went into shock, which grew worse in spite of supportive treatment. She died the next day.

An autopsy was performed by Dr. Summerville and his report is as follows:

"The body of an emaciated, elderly woman showing an abdominal incision closed by sutures.

"**Chest:** No fluid was present. There were loose adhesions over the lower lobes of both lungs.

"Lungs: The left lung showed a hemorrhagic infarct involving the greater portion of the lower lobe. The remainder of the lobe and the upper lobe were grossly negative. The right lung showed two small hemorrhagic infarcts in the lower lobe. The upper and middle lobes appeared grossly negative.

"Heart: The heart was normal in size. The myocardium, endocardium, and valves were essentially negative.

"**Abdomen:** There was marked extravasation of blood into the tissue surrounding the surgical incision and there was clotted blood beneath the rectus sheath, posteriorly, and from the ribs to the pelvis. There was a small amount of serosanguineous fluid in the abdominal cavity. No abdominal viscus showed gross pathology of any ordinary sort.

"**Note:** All of the tissues of the body were very soft and friable. Moderate pressure on any of the viscera would result in rupture. The large blood vessels, on slight tension, pulled in two. On lifting the heart, to cut the large vessels, the aortic and pulmonary arteries ruptured, and the fingers of the lifting hand penetrated the myocardium to the cavity.

"**Microscopic findings:** Sections from the lungs showed large areas in which the alveoli were filled with red blood cells and the interalveolar vessels were markedly engorged. The heart muscle showed a loss of cross striation. The liver showed considerable engorgement and moderate parenchymatous degeneration. The kidneys showed some thickening of the medium-size arteries and some glomerular fibrosis. Sections from the rectus muscle showed hemorrhage with areas of organization. The pancreas and adrenals showed no significant changes."

Summary

The first case is illustrative of hemorrhage into the rectus from direct violence—a blow over the lower abdomen. The second case exemplifies two different etiologic factors. The patient's age (63) and some degree of emaciation possibly weakened the muscle fibers. The other factor, the immediate cause, was the strain of lifting a tub.

The suggestion of tumor was perhaps nothing more than edema, and the absence of a definite tumor can be explained by the rupture of the friable peritoneum, which dumped the blood into the abdominal cavity. Incidentally, this is the only case reported in which the peritoneum ruptured.

The absence of the classical diagnostic symptoms in this case—tenderness and rigidity limited to the area of the injury—is due to the fact that the rupture of the peritoneum discharged the blood into the peritoneal cavity, and to the co-existing appendicitis, which caused a more diffuse tenderness and rigidity.

Conclusion

1. Rupture of the rectus muscle, with hemorrhage into the rectus sheath, is of interest as a clinical entity, and of importance because of the similarity of its symptoms to those of acute intra-abdominal, surgical conditions which demand immediate operation.

2. Case 2 is an unusual instance of coexistence of two acute surgical conditions, apparently not related in any way, unless the appendicitis could have resulted from trauma.

3. The friability of tissues which was demonstrated in the skin, the blood vessels, and the viscera of the second patient, as well as in the ruptured muscle and ruptured peritoneum, is of peculiar interest. I have been unable to find any reference whatsoever to such extensive friability of tissue in living patients.

PRE-ECLAMPTIC TOXEMIA OF PREGNANCY

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Titus[1] defines pre-eclamptic toxemia as a "profound disturbance in maternal metabolism, aggravated by the presence of a parasitic organism, the fetus." This definition is not entirely accurate, however, for eclampsia may occur days after delivery of the fetus and placenta, in patients who have shown no evidence of antenatal toxemia; it may also occur in patients with hydatidiform mole. In the constant search for the cause of toxemia these facts are significant; they would seem to indicate that "the causative agent must be confined to the maternal organism, although undoubtedly activated or conditioned by the product of conception."[2]

Most authors now believe—and much evi-

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1. Titus, Paul: The Management of Obstetric Difficulties, ed. 3, St. Louis, The C. V. Mosby Company, 1945, pp. 375-437.

2. Stander, H. J., Bonsnes, R. W., and Stromme, W. B.: Late Postpartum Eclampsia, Am. J. Obst. & Gynec. 52: 765-772 (Nov.) 1946.

dence has been presented to support the belief—that toxemia of pregnancy is an affection of the vascular system and that vasospasm of the small terminal arterioles plays an all-important role in the pathogenesis of the disease[3]. It is only by accepting this theory that we can explain the return to normal kidney function in many pre-eclamptic and eclamptic patients twenty-four hours *post partum*. This occurrence precludes an organic lesion and presupposes a functional one[4]. Angiospasm, decreasing or even stopping the blood flow through the glomeruli, would explain many of the findings in toxemia and would, if continued too long, result in permanent kidney damage and impaired function. All of the agents used in treating toxemia—morphine, magnesium sulfate, barbiturates, veratrum viride, and caudal or spinal anesthesia—are directed toward relief of vasospasm. The trigger factor setting off this mechanism of vasospasm remains a mystery. In spite of this important missing link, much progress, from a clinical standpoint, has been manifested in the past few years in regard to our knowledge of toxemia.

Many reliable investigators have demonstrated that, under ideal conditions, toxemia of pregnancy can be almost entirely prevented. Progress made against toxemia in controlled series is comparable with the results obtained in the prevention of puerperal infection since the advent of the sulfonamides[5]. Although the specific etiologic factor of toxemia still eludes us, we cannot ignore the results which have been accomplished by proper preventive treatment.

Prevention

Principles of prophylaxis

The prevention of toxemia should begin as early as possible in pregnancy, with prophylactic measures designed (1) to prevent an excessive weight gain, (2) to assure a more than adequate protein diet, and (3) to prevent the retention of sodium and water[6]. Under such a regimen severe pre-eclampsia seldom develops, and, if it is adequately treated, rarely results in eclampsia.

Luikart[5] recently reported that in a series of 1,000 normal, pregnant women who cooperated on a regimen of rigid weight contol with adequate nutrition, no true toxemia developed, no patient's blood pressure exceeded 145 systolic, 85 diastolic, and edema was negligible. When edema occurred, it disappeared in four to ten days on a salt-poor diet with an increase in the protein intake. He assumes that every pregnant woman is at least a potential candidate for toxemia of pregnancy — an assumption which seems logical. The objective of Dr. Luikart's program was to restrict the total weight increase to 16 pounds or less, or a maximum of 2 pounds in any one month of pregnancy. There were no large babies in his series, but the average weights were only slightly less than 7 pounds. His diets were high in protein.

Williams[7] states that the incidence of toxemia in pregnancy was twice as great in a group of pregnant women whose protein intake was 60 to 70 Gm. daily as in a similar group whose protein intake ranged from 110 to 120 Gm. daily. Leverton and McMillan[8] found that women who received, in addition to their self-chosen diets, a 5-ounce serving of meat daily from the fifth month of pregnancy to the third month after delivery, had higher hemoglobins and red cell counts, less edema, and better lactation. Dieckmann[9] believes that anemia predisposes to edema and toxemia. Collins[3e] and many others are convinced that the liver plays a large part in toxemia, and that it is essential to protect the liver function by supplying sufficient amounts of the vitamin B complex. A diet high in protein assures an adequate intake of vitamin B. It has been found that the incidence of late toxemia is increased in patients who had severe nausea and vomiting during the first trimester[10]. In view of the evidence showing the necessity for a high

3. (a) Harkins, J. E.: Veratrum Viride in the Treatment of Pre-Eclampsia, Eclampsia, and Other Hypertensive Syndromes of Pregnancy: A Preliminary Report, Texas State J. Med. 41:143-151 (July) 1945; (b) Aikawa, J. K.: Pathogenesis of the Toxemias of Late Pregnancy, North Carolina M. J. 7:46-59 (Feb.) 1946; (c) Goldblatt, H.: Studies on Experimental Hypertension: Pathogenesis of Experimental Hypertension Due to Renal Ischemia, Ann. Int. Med. 11:69-103 (July) 1937; (d) Dill, L. V. and Erickson, C. C.: Eclampsia-Like Syndrome Occurring in Pregnant Dogs and Rabbits Following Renal Artery Constriction, Proc. Soc. Exper. Biol. & Med. 39:362-365 (Nov.) 1938; (e) Collins, C. G.: Personal communication, April 3, 1947.
4. Dieckmann, W. J.: Toxemias of Pregnancy, Surg., Gynec. & Obst. 59:678-681 (Oct.) 1934.
5. Luikart, R.: High Protein, Low Caloric Diet for the Prevention of Toxemia of Pregnancy, Am. J. Obst. & Gynec. 52:428-434 (Sept.) 1946.
6. Bump, W. S.: Management of Toxemia in the Last Trimester of Pregnancy, Wisconsin M. J. 42:1037-1043 (Oct.) 1943.
7. Williams, P. F.: The Importance of Adequate Protein Nutrition in Pregnancy, J.A.M.A. 127:1052-1055 (April 21) 1945.
8. Leverton, R. M. and McMillan, T. J.: Meat in the Diet of Pregnant Women, J.A.M.A. 130:134-136 (Jan. 19) 1946.
9. Dieckmann, W. J.: The Toxemias of Pregnancy, St. Louis, The C. V. Mosby Co., 1941, p. 71.
10. Missett, J. V.: Relationship between Early and Late Toxemias of Pregnancy, 27:697-700 (May) 1934.

intake of protein and vitamins, it might seem logical to assume that the late toxemia is a result of dietary inadequacies produced by the prolonged nausea and vomiting.

It has been observed that weight gain between the twenty-fourth and thirty-eighth weeks of pregnancy is 50 per cent greater in toxemic patients than in normal pregnant women, and that during the last two weeks of pregnancy it is almost three times as great[11]. Much of the sudden weight gain is due to edematous fluid, but the factors of overeating, underexercising, and actual weight gain from additional body tissues are of great importance as predisposing causes of toxemia[1]. Rossenbeck[12] found that the sodium content of muscle is slightly increased in normal pregnancy and is enormously increased in eclampsia. He also found that calcium absorption was higher with a high-protein diet than with a low protein intake.

The high incidence of toxemia of pregnancy in charity hospitals and wards as compared with the low incidence among private patients shows the direction in which most effort should be exerted. Investigation into the diet of these clinic patients, in the light of what we now know, reveals the obvious reasons for the high incidence of toxemia among them. Too often, the meat intake of such patients consists solely of salt pork, which is usually fried. They eat few eggs, because they don't like them. Cornbread, biscuit, grits, rice, corn, potatoes, beans, turnips, molasses, and fruits canned in sugar make up the bulk of their diets. Such a diet, low in protein and high in starches, fats and salt, is conducive to excessive weight gain, anemia, vitamin deficiencies, and fluid retention—all factors predisposing to toxemia. More and more patients in the low-income and indigent groups are being reached by prenatal care through local, state, and federal clinics, but too often the economic status of these people prohibits their complying with dietary advice. In such patients we shall continue to have toxemia of pregnancy.

11. McIlroy, L. and Rodway, H. E.: Weight Changes during and after Pregnancy, with Especial Reference to Early Diagnosis of Toxemia, J. Obst. & Gynaec. Brit. Emp. 44: 221-224 (April) 1937.

12. Rossenbeck, H.: Eklampsie und Ionenhaushalt, Blut- und Organ-analytische Untersuchungen als Beitrag zur Patho-Biologie der Eklampsie, Arch. f. Gynaek. 145:331-410, 1931.

Antepartum care and education of the patient

Routine antepartum care has done so much to reduce the morbidity and mortality of toxemia that its importance cannot be too strongly emphasized. This is the only way by which early symptoms may be detected. Too often, however, antepartum care does not do all that it should. It should be more than just a vigilant watch; it should be an active period of education for the patient. She must be convinced of the importance of instructions and of the potential hazards if they are not followed. Success in weight control depends largely on the first seven months, and if the patient lets her appetite get out of bounds during that time, toxemia is sure to follow in a certain proportion of cases[13]. Obviously wholehearted cooperation of the patient is essential. This cooperation will only be obtained by spending time at each prenatal visit in explanations, instructions, and advice. Make her understand what you are trying to do, and why and how. Make her diet- and weight-conscious, and give her the reasons for doing so. She must be impressed with the fact that her own safety and welfare, and that of her baby depend chiefly on her cooperation.

Old fallacies must be dispelled and erroneous impressions corrected. Assure the patient that she does not have to eat for two, and that women who have lost weight throughout gestation have had normal-sized, healthy babies. Explain that cravings for foods during pregnancy are not a demand for nourishment on the part of the baby; clear up the "for every child a tooth" adage, and impress on her that the calcium in her teeth is fixed and cannot be drawn away by her unborn child, and that excessive calories in the form of milk and fruit juices are therefore unnecessary. Luikart[5] cites the case of a woman who gained 110 pounds during pregnancy! It was found that she had bad teeth, but had avoided a dentist, believing that his work would bring on miscarriage. In the last four months of her pregnancy three quarts of milk and the juice of six oranges daily had been prescribed to prevent further damage to her teeth.

13. McCance, R. A., Widdowson, E. M. and Lehmann, H.: The Effect of Protein Intake on the Absorption of Calcium and Magnesium, Biochem. J. 36:686-691, 1942.

Dietary instructions

Apparently simple dietary instructions are much better heeded by the average patient than the usual routine, unattractive, printed forms and lists. The mother should be told that the baby obtains its growth principally from proteins, minerals and vitamins, and that her protein intake must exceed that taken prior to pregnancy. Meat, in the form of beef, lamb or fish, should be eaten at least once daily. One or two eggs should be eaten daily, and liver once or twice weekly. These foods may be prepared in any manner except fried. Each day the patient should have two servings of cooked, green vegetables. Let her know that green vegetables contain valuable vitamins, and readily assimilable proteins and minerals. Skimmed milk, which contains more calcium than whole milk, may be allowed with meals when weight gain is not excessive. These items form the bulk of her diet, and starches, sweets and fats in limited amounts may be added to balance the meals. Intake must be reduced at the expense of the latter, when there is evidence of excessive weight gain.

When starches must be reduced, the doctor should explain that he means bread, potatoes, grits, spaghetti, macaroni, corn, pastries, and sweets. The patient should be told that the morning "coke" contains 75 calories, and that the excessive eating of fruit is unnecessary; the average apple contains 85 calories and the average banana 125 calories. She must be trained to obey the scale rather than the appetite, and to leave the table hungry when she is gaining excessively. Practically any food that relieves hunger has caloric value. Obviously each patient must be strictly individualized and helped with her own particular diet, as differences in digestion, assimilation, and utilization will produce different results in patients on the same intake[5].

From the beginning of pregnancy the intake of salt should be decreased. The patient may use salt for cooking if her weight is under control, but she should stop sprinkling on extra salt at the table from the start. We know now that most edema is best controlled and even prevented by limiting the intake of sodium chloride[14]. Pretzels, cheese, sausage, salted meats, mustard, and catsup are among the foods to be avoided because of their salt content. If the patient absolutely rebels against saltless foods, salt substitutes which are free of the sodium radical may be used. The patient must be taught that this same sodium radical is present in sodium bicarbonate and in most of the patent medicines used for the relief of gastric distress.

Calcium and vitamin D should be supplied daily when the milk intake is not ample, and iron may be added if necessary. Luikart[5] gave thyroid extract to those patients in his series who could tolerate it, and suggested that 5 mg. of benzedrine sulfate three times daily may be helpful in curbing an uncontrollable appetite. Needless to say, good general hygiene, regular elimination, suitable exercise, avoidance of chilling, and ample rest are essential fundamentals of each antenatal program.

Treatment

The early symptoms of toxemia are malaise, dullness or drowsiness, headache, slight swelling of the face and extremities, and a decrease in the amount of urine voided. Characteristically, the patient seems to have a mental sluggishness or indifference which often causes her to neglect to report symptoms about which she has been carefully forewarned. Visual disturbances, vertigo, and epigastric pains are more advanced symptoms. The physician should not wait for albuminuria to appear, but should act at the first sign of a rise in blood pressure, or a sudden weight gain. Place the patient at bed rest, further increase her protein intake, and eliminate salt. A mild sedative such as phenobarbital should be given, elimination should be increased by magnesium sulfate, and intravenous injections of hypertonic glucose are valuable, especially in the presence of edema.

The active treatment of pre-eclampsia is essentially the preventive treatment of eclampsia[1]. If begun early enough, careful medical management of the toxemic patient will usually prevent further increase in the severity of symptoms and signs until labor supervenes, or until the cervix is "ripe." If, however, the toxemia is progressive, despite treatment, or even if it fails to show prompt improvement, interruption of pregnancy must be considered. The condition of the

14. Browne, Francis J.: The Significance of Signs and Symptoms in Toxaemia of Pregnancy, Edinburgh M. J. 51:449-459 (Nov.-Dec.) 1944.

cervix should determine the method employed. Induction of labor, especially in the primigravida, should be medical rather than instrumental, because it may be advisable to resort to cesarean section if repeated attempts at induction fail. Cesarean section may be a much more conservative procedure than an unsuccessful instrumental induction, which may produce infection and which often causes many hours of ineffectual pains. Labor and delivery may sometimes be the final strain necessary to produce convulsions in a pre-eclamptic patient.

Should eclampsia develop, the essential principles of treatment are the control of convulsions by proper sedation, and the production of diuresis. All measures are directed primarily at relief of vasospasm. Morphine and intravenous magnesium sulfate should be used to provide complete muscular rest and relaxation. Prolonged sedation may be secured by the hypodermic administration of such drugs as sodium phenobarbital. Intravenous magnesium sulfate should be repeated as long as there is evidence of cerebral irritation. Intravenous hypertonic glucose is valuable, but only in the smallest amounts necessary to restore a satisfactory urinary output, thereby helping to avoid cardiac embarrassment and pulmonary edema. Intranasal oxygen given continuously is invaluable. If oliguria is persistent or if anuria develops, or vascular collapse occurs, a blood transfusion is indicated. During the seizures the patient must be protected from injury to herself by the use of a tongue guard, removal of false teeth, and so forth. Should labor occur during eclampsia, rapid delivery should be effected as soon as the cervix is dilated.

Attempts to terminate pregnancy immediately after the convulsions have ceased are ill advised and dangerous. Therapy of the post-convulsive state consists in constant observation, nasal oxygen, study of the urinary output, and continued sedation. When the patient is able to swallow, she should be given magnesium sulfate orally and nourishment in the form of sweetened fruit juices frequently. Later, skimmed milk and more protein are given. As soon as possible, a thorough obstetric examination should be made. When the eclampsia is controlled and the patient's condition stabilized, or if relapses which are not readily controlled occur, the pregnancy should be terminated. No fixed rules for the method of termination can be made, and the choice must depend on conditions present, with particular regard to the cervix, and on the judgment of the operator.

Conclusions

While its incidence is steadily decreasing, toxemia of pregnancy is still one of the most frequent causes of maternal deaths in this country. It is difficult to reconcile this fact with the knowledge that toxemia of pregnancy is largely preventable. At present our most potent weapon against toxemia, and one of which we should take full advantage, seems to be prophylaxis. This consists of complete prenatal care, with particular regard to obtaining the patient's full cooperation in (1) restricting the total weight gain, (2) obtaining a diet high in protein and vitamins, and (3) restricting the sodium intake.

CAUSALGIA

Its Etiology, Diagnosis and Treatment with Tetra-Ethyl-Ammonium Chloride (Etamon Chloride)

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and
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Causalgia is a painful, posttraumatic state occurring in an extremity. It is a single, but very prominent, component of a pathologic condition best known, perhaps, as reflex sympathetic dystrophy. The term causalgia means "burning pain," and a deep, diffuse, burning pain with paroxysmal exacerbations is the cardinal symptom of this state. Causalgia has, as a rule, two other singular characteristics: (1) the distribution of the pain is rarely segmental, and (2) the trauma which incites it is generally negligible.

This condition was first described more than one hundred years ago, but apparently its typical pattern has not often been recognized clearly. Among the numerous synonyms for this condition which appear in

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medical literature are causalgia[1], posttraumatic painful osteoporosis[2], peripheral trophoneurosis[3], chronic traumatic edema[4], Sudeck's atrophy[4], traumatic vasospasm[5], traumatic angiospasm[6], and reflex sympathetic dystrophy[7]. There are other names for this condition, particularly in the Continental literature. In the more recent American medical literature it customarily has been referred to as reflex sympathetic dystrophy or causalgia.

Symptoms and Signs

There is only one symptom of causalgia: a burning pain with paroxysmal exacerbations. With very few exceptions, a striking disparity exists between the severity of the pain and the minor nature of the trauma causing it.

The signs by which this state manifests itself, however, are several. Although they may not be particularly evident at first, they can be found if searched for. These signs may be divided roughly into two stages, depending upon the duration of the process. These two stages are described below; we would like to point out, however, that causalgia is occasionally a rapidly self-limiting state and that following adequate immobilization of the injured part and the institution of physiotherapeutic measures many cases of suspected causalgia will subside. When the usual therapy does not result in prompt recovery, however, serious consideration should be given to the possible existence of a "major causalgia."

The signs in the first stage of causalgia persist, generally, for six to eight weeks. During this period the extremity is warm and dry; the muscles supplying the part are spastic; and moderate edema is usually present, particularly about the joint spaces. Hyperalgesia, confined to the area of injury, is almost invariable[6,8].

The second stage of this disease usually begins with the spread of the previously periarticular edema to surrounding soft parts. The affected limb slowly becomes cold to the touch; it feels hard, and a mottled cyanosis appears. The joints become stiff, and early muscle atrophy is generally discernible at this point. The former dryness of the skin is replaced by a hyperhidrosis. Throughout all of this time the distressing symptom of this disease is persistent, and the hyperalgesia is now diffuse. If serial roentgenograms have been taken, a characteristic, mottled osteoporosis, originally described by Sudeck, may be demonstrated early in the second stage[9]. In time, the patient's apparently inconsequential primary trauma, under standard treatment, results in such manifest uselessness of the extremity and such extreme pain that amputation of the part is not infrequent. Amputation, while removing the signs, leaves the symptom, in the form of a "phantom limb," so frequently that such surgery is rarely advisable.

The differential diagnosis of causalgia entails only two major considerations[10]—hysteria and "compensation neurosis." There are several reasons that causalgia is often confused with hysteria: first, the pain and hyperalgesia follow no particular segmental area, as a rule; second, the discomfort is almost always far out of proportion to the degree of the injury causing it; and third, these patients display a rather extreme emotional lability in many instances.

For the same reasons, the physician is often sceptical of this peculiar pain state when compensation is involved in the case. Before a patient is labeled with the diagnosis of "compensation neurosis," however, causalgia should always be considered, and the patient should be given the benefit of therapy directed toward this condition. It must be remembered that the appearance of causalgia in medical literature was considerably antecedent to modern compensation leg-

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3. zur Verth, M.: Periphere akute Trophoneurose der Hand, Monatschr. f. Unfallh. 36:309-317 (July) 1929.
4. de Takats, G.: Nature of Painful Vasodilatation in Causalgic States, Arch. Neurol. & Psychiat. 50:318-326 (Sept.) 1943.
5. Lehman, E. P.: Traumatic Vasospasm, Arch. Surg. 29:92-107 (July) 1934.
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7. de Takats, G.: Reflex Dystrophy of Extremities, Arch. Surg. 34:939-956 (May) 1937.
8. Livingston, W. K.: Pain Mechanisms: A Physiological Interpretation of Causalgia and Its Related States, New York, The Macmillan Company, 1943.
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10. (a) Evans, J. A.: Reflex Sympathetic Dystrophy, Ann. Int. Med. 26:417-426 (March) 1947; (b) Mazet, R., Jr.: An Elucidation of Certain Commonly Disregarded Neurovascular Manifestations in War Wounds of Traumata to the Extremity, in Thomson, J. E. M.: Lectures on Reconstruction Surgery of the Extremities, Ann Arbor, Mich., J. W. Edwards Co., 1944, pp. 190-195.

islation[1,11]. As early as 1813 Alexander Denmark, in describing a soldier with a soft tissue injury of the arm, noted the cardinal symptom of causalgia: "I always found him with the forearm bent in a supine position supported by the firm grasp of the other hand. The pain was of a burning nature and so violent as to cause continual perspiration from his face."

Mechanism and Etiology

Upon considering the signs of causalgia described above, the physician will see that in this state there is an abnormal activity of the anterior horn cells within the gray matter of the spinal cord; this activity is manifested by muscle spasm[8]. The edema, cyanosis, hyperhidrosis, and excessive warmth or cold of the skin attest to an abnormal response of the sympathetic motor cells located in the gray matter of the lateral horn of the cord[8,9a,12]. How these abnormal responses of the motor and sympathetic systems occur and why they persist are most clearly explained by Lorente de No[13]. A diagram of the pathologic reflexes which account for the state of causalgia is shown in figure 1, which is briefly interpreted below:

The initial injury, involving sensory nerve filaments, becomes, for some reason, a source of chronic irritation[8]. These sensory nerves, on entering the gray matter of the cord, make a synapse with "second-order" neurons which send their axons upward to the thalamus, where a synapse with a "third-order" neuron is made; these latter neurons send their axons to the sensory cortex. Constant afferent impulses from the injured area, a "trigger point,"[8] set up an abnormal state of activity in the second-order neurons in the gray matter of the spinal cord, and these second-order neurons in turn complete the reflex by stimulating the anterior horn cells and the sympathetic motor cells in the lateral horn; in addition, these second-order neurons transmit the sensation of pain upward. The ensuing muscle spasm and vasomotor changes which this disturbance in the cord has produced now furnish new sources of pain and, thus, new reflexes. A vicious circle

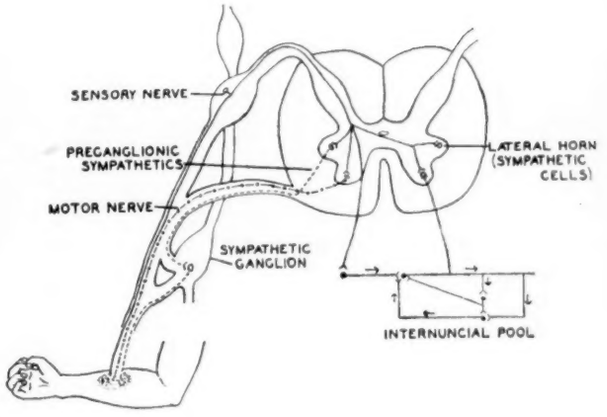

Fig. 1

is created.

If the "trigger point" is removed early, the pain may subside[8]. If the process is allowed to continue, however, the constantly incoming sensory impulses will spread over larger and larger areas of second-order sensory neurons[14] in the gray matter upward, downward, and even occasionally across the cord. The sensation of pain then becomes diffuse, and in this stage the removal of the original source of irritation may not be enough to relieve the discomfort. If the condition continues to remain untreated, this ever-widening "pool" of abnormal activity in the cord may eventually involve the thalamus and the neurons representing its sensory radiation; when this stage is reached, the sensation of pain is said to be indelibly "imprinted" on the sensory cortex, the pain becoming a habit, as it were. Like a habit the pain may persist independently long after the original cause for its development is removed.

Figure 2 illustrates graphically the fact that the sensory nervous system is susceptible to painful stimuli at each of the three different levels[15]—a point which de Takats[16] recently emphasized. With this fact in mind, certain states remarkably resembling causalgia but resulting from no peripheral trauma can be clarified. Examples of such states are the reflex hyperirritability of acute anterior poliomyelitis (a "second neuron" lesion) and the painful posthemiplegic states occasionally seen (a "third neuron" lesion). Thus causalgia may be seen to follow central

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12. Homans, J.: Minor Causalgia: A Hyperaesthetic Neurovascular Syndrome, New England J. Med. 222:870-874 (May 23) 1940.
13. Lorente de No, R.: Analysis of the Activity of Chains of Internuncial Neurons, J. Neurophysiol. 1:207-244 (May) 1938.
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15. Wilson, K.: Dysesthesiae and Their Neural Correlates, Brain 50:428-473 (Oct.) 1927.
16. de Takats, G.: Causalgic States in Peace and War, J.A.M.A. 128:699-704 (July 7) 1945.

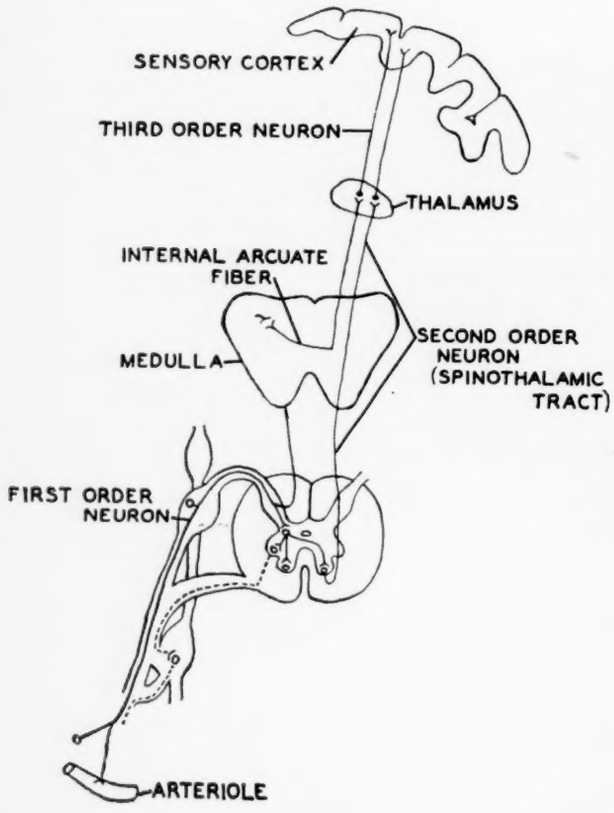

Fig. 2

as well as peripheral lesions; but yet more remarkable is the variety of apparently unrelated injuries which can produce causalgia. Indeed, we are of the opinion that the syndrome of causalgia may be inherent in most of man's acute afflictions; the scope of this paper, however, is limited to those causalgic states which occur in extremities following a local trauma.

Only a few of the various etiologic agents which have been reported as the sources of causalgic states are mentioned below to indicate the wide range of responsible causes. A paper by Evans[17] on this subject lists many more. Although it generally follows minor injury, such as sprain, causalgia has been described as a sequel of thrombophlebitis, plantar warts, subdeltoid bursitis, cerebral hemorrhage ("thalamic syndrome"), bismuth injections, and operative proeedures. The operative procedure most often responsible for this state is an amputation, following which causalgia, when it appears, presents itself as a "phantom limb." During wartime, causalgia is frequently attributable to injuries of and around nerves (1,2,16).

17. Evans, J. A.: Reflex Sympathetic Dystrophy, Surg., Gynec. & Obst. 82:36-43 (Jan.) 1946.

Treatment

Precisely how interruption of impulses in the sympathetic nervous system acts to ameliorate the pain of causalgia is by no means certain. Rather good evidence exists to show that afferent pain impulses are transmitted only by way of the posterior root, and that the sympathetic fibers entering the cord by way of the paravertebral ganglia are not responsible for the central conduction of pain impulses. Most physicians, at least, consider the sympathetic nervous system as purely an efferent one. Some observers, however, maintain that sympathetic afferent fibers are supplied to the peripheral blood vessels[2] and that these are the ones responsible for the painful syndrome under consideration[10b]. The fact that the pain and hyperesthesia of causalgia are more suggestive of visceral than of somatic pain is some evidence of the presence of afferent sympathetic fibers. Future investigation may clarify this point.

De Takats has found that it is most satisfactory to aim the therapy of causalgia at the particular sensory level which seems to be involved[16,18]. Thus, in early cases, local novocaine injections into any trigger points would represent attack upon the first neuron level. Interruption of the sympathetic reflex arc by novocaine injection about the regional paravertebral ganglia would represent therapy directed toward the second neuron level. Paravertebral sympathetic ganglionectomy has been used when novocaine injection has produced temporary but not permanent relief[2,7,8,11,17,19]. Posterior rhizotomy and chordotomy[20] are also classified as therapeutic attacks on the first and second neuron levels, respectively, and have been used successfully when other more conservative measures have failed. When the condition reaches the third neuron level, ablation of the sensory cortex supplying the painful area, or prefrontal lobotomy becomes necessary[21].

These methods have all been used where

18. de Takats, G.: Causalgic States and Neurotrophic Lesions of the Exremities, in Thomson, J. E. M.: Lectures on Reconstruction Surgery of the Extremities, Ann Arbor, Mich., J. W. Edwards Co., 1944, pp. 112-119.
19. Atlas, L. N.: Traumatic Vasospastic Dystrophy of the Extremities, Arch. Surg. 42:1042-1047 (June) 1941.
20. Stookey, B.: The Management of Intractable Pain by Chordotomy, A. Research Nerv. & Ment. Dis., Proc. (1942) 23:416-463, 1943.
21. (a) de Gutierrez-Mahoney, C. G.: The Treatment of Painful Phantom Limb by Removal of Postcentral Cortex, J. Neurosurg. 1:156-162 (March) 1944; (b) White, J. C.: Pain after Amputation and Its Treatment, J.A.M.A. 124: 1030-35 (April 8) 1944.

indicated, with varying degrees of success. Injection of trigger points with novocaine is a simple procedure that may give some relief in early cases. Injection or excision of a paravertebral ganglion is relatively easy to do and is frequently effective in treating a lesion of the second neuron level. Other procedures are directed toward cutting the sensory tracts from the area involved and permanently removing all reception of pain and temperature from the area.

It is important that active exercise and physiotherapy be used in combination with any method of treatment employed, because it is only by use that the affected part will regain its normal appearance and function. The various types of treatment described above serve mainly to relieve the pain and some of the swelling; the patient is then capable of working out the stiffness and restoring the part to normal by his own activity.

Tetra-ethyl-ammonium chloride (Etamon)

During the past year or so a new therapeutic agent, tetra-ethyl-ammonium chloride, has become available for investigational use in the treatment of causalgia and related phenomena[22]. The experimental work of Acheson and Moe and subsequent clinical data, gathered largely from the departments of surgery, medicine, and pharmacology of the University of Michigan, have demonstrated that the chief property of tetra-ethyl-ammonium chloride is that it acts as a "blockade" of both the sympathetic and the parasympathetic divisions of the autonomic nervous system[23]. The wide scope of its possible uses in medicine and surgery is immediately obvious, and it has been tried with considerable success in a large number of conditions known or thought to be on a basis of disturbance of the sympathetic nervous system. Our experience with its use has been limited chiefly to causalgia and related phenomena. While we have not yet gathered a large enough series upon which to base statistics, our present impression of the drug is sufficiently favorable to warrant a preliminary report.

The drug may be given intravenously or intramuscularly with equal effect[22a]. It provides a much simpler method of therapy, for both the patient and the physician, than paravertebral sympathetic block, and we believe that in certain cases it is at least as effective. It has served as a valuable preoperative test for the effectiveness of sympathectomy in vascular diseases where permanent sympathetic block was thought advisable. Perhaps of greater importance, however, its administration has apparently resulted in permanent relief of pain in certain reflex sympathetic dystrophies.

Its action in these cases is to interrupt temporarily the sympathetic "reflex," or the constant bombardment of painful impulses being transmitted to the cord, which de Takats and other observers have indicated may be the underlying neuropathology of causalgia[13,16]. The repeated temporary interruptions of the reflex apparently result in a permanent cessation of the flow of the aberrant sensory impulses, just as do repeated paravertebral sympathetic blocks by novocaine. It is too early to say whether or not the pain of these syndromes will return later and require another course of treatment. Other published work on the treatment of such conditions with local injections of novocaine and with paravertebral block indicates that it may[8], but the fact that it might is no reflection on the efficacy of the drug.

Harmful side effects of the drug are minimal and temporary, and its use is apparently without danger. There is usually a drop in blood pressure and a rise in pulse, a metallic taste in the mouth, some blurring of vision, occasionally slight nausea, tingling in the extremities, and vague dizziness or sleepiness. These effects usually pass off in half an hour after intravenous administration; they are less marked but last longer after intramuscular injection. If any ill effects should develop they can be immediately counteracted by the use of adrenalin[22a].

Data on the use of this drug in a number of orthopedic conditions, including causalgia and other neurocirculatory phenomena, will appear in a later report. The following

22. (a) Berry, R. M. et al.: The Use of Tetra-Ethyl-Ammonium in Peripheral Vascular Disease and Causalgic Disorders 20:525-535 (Oct.) 1946; (b) Coller, F. A. et al.: Tetra-Ethyl-Ammonium as an Adjunct in the Treatment of Peripheral Vascular Disease and Other Painful States, Ann. Surg. 125:729-753 (June) 1947; (c) Hoobler, S. W. et al.: The Effect of Autonomic Blockade with Tetraethylammonium on the Renal Circulation in Dogs and in Normal and Hypertensive Patients, Univ. Hosp. Bull. 13: 9, 1947.

23. (a) Acheson, G. H. and Moe, G. K.: The Action of the Tetra-Ethyl-Ammonium Ion on the Mammalian Circulation, J. Pharmacol. & Exper. Therap. 87:220-224 (Sept.) 1946; (b) Acheson, G. H. and Moe, G. K.: Some Effects of Tetraethyl Ammonium on the Mammalian Heart, ibid. 84: 189-195 (June) 1945; (c) Acheson, G. H. and Pereira, S. A.: Action of Tetraethyl Ammonium Bromide on the Mammalian Neuromuscular System, Fed. Proc. 5:161, 1946.

rather dramatic case reports, however, will serve to indicate what may be expected from the drug.

Case Reports

Case 1

A 64-year-old white male had his right leg amputated below the knee for peripheral arteriosclerotic gangrene in October, 1945. The wound did not heal, and another amputation was done at a slightly higher level in December, 1945. Nine days after this last operation he began to complain of "cramping pain" in the right stump. He was discharged from the hospital, however, on the twelfth postoperative day, with a healed amputation stump. He was followed in the outpatient department for the next three months, and continued to complain of pain of a "cramping" nature in the right stump.

In April, 1946, he was admitted to the County Home with a diagnosis of "phantom pain following amputation of right leg." This pain persisted for the next five months. It was present constantly, but there were exacerbations for which the patient required frequent sedation and local novocaine injections into the stump. In May, 1947, a paravertebral novocaine block of the sympathetic ganglia from the twelfth thoracic to the fourth lumbar ganglia inclusive was done, with considerable relief of symptoms for about eight hours.

Beginning July 29, 1947, tetra-ethyl-ammonium chloride was injected intravenously, in doses of 500 mg. daily, for five consecutive days. He noted no response to his first injection, but following the second intravenous injection he felt that the pain was greatly ameliorated. This relief lasted about eighteen hours. Following the third injection the pain did not recur, and has not returned to date—a period of twenty-six days.

Case 2

A 45-year-old white female fell on January 14, 1947, injuring her right wrist and elbow. She did not see a physician until two weeks later, when she was complaining of pain, limited motion, and swelling in the elbow, wrist, and hand. At that time x-rays showed a fracture of the head of the radius without displacement, but no bony injury in the wrist. Gentle active use was advised, and a sling was worn for protection. Swelling and pain continued, and motion became more limited in spite of the use of gentle massage and exercise.

She was admitted to the hospital on April 11, 1947, with a red, swollen, shiny wrist and hand, and a moderately swollen elbow. Motion in the extremity was as follows: 25 per cent of normal in her fingers, 0-degree pronation and supination of the forearm, 10-degree flexion and extension of the wrist, 30-degree flexion and extension of the elbow. She was given 400 mg. of tetra-ethyl-ammonium chloride intravenously on each of five successive days, and advised to use the hand actively all she could.

By the end of the fourth injection the pain was gone, except for that which accompanied active stretching of the stiff joints. She then had 75 per cent of normal motion in her fingers, 45-degree pronation and supination of the forearm, 20-degree flexion and extension of the wrist, and 45-degree flexion and extension of the elbow. She was discharged after the fifth injection with instructions to continue active use of the extremity.

On May 21, 1947, she had about 80 per cent of normal motion in the fingers, 70-degree pronation and supination of the forearm, and 100-degree flexion and extension of the elbow.

When last seen on August 21, 1947, she had 90 per cent of normal use of her fingers, normal range of flexion and extension of the wrist, and normal range of flexion and extension of the elbow except for the last 5 or 10 degrees of extension. She had no pain and was working full time without any complaint.

Summary

Causalgia or reflex sympathetic dystrophy has been discussed from the standpoint of etiology, signs and symptoms, and treatment. The orthodox methods of treatment have been reviewed, and a new method employing tetra-ethyl-ammonium chloride described. Case reports indicating its efficacy have been presented.

Maternal Welfare Section*

CASE REPORTS FROM THE MATERNAL WELFARE RECORDS

Postpartum Hemorrhage

The completed records of the maternal deaths which occur in the state of North Carolina provide interesting case histories demonstrating common obstetric problems. The two records which follow are typical examples of the problem of postpartum hemorrhage. The first case was considered a preventable death; the second an unavoidable fatality.

Case 1—N.C.M.W.C. 14

The patient was a 35-year-old white woman who had had 10 pregnancies and 2 abortions. She had had severe postpartum hemorrhages following her last two deliveries. The patient did not seek prenatal care, and was seen by her physician for the first time at the onset of labor. His examination revealed no gross physical abnormalities and no evidence of toxemia. Facilities were not available for laboratory examination of the blood and urine.

The patient was delivered at home, following a labor of fourteen hours with the fetus in the occiput posterior position. The labor was characterized by short, weak uterine contractions. Complete dilatation of the cervix occurred in eleven hours, and the physician waited three hours for rotation of the fetal head and a spontaneous termination of labor. Moderate bleeding occurred throughout the entire second stage of labor. Sedation consisted of 100 mg. of demerol, and delivery was effected under ether anesthesia with low forceps. The head was rotated to an occiput anterior position; the forceps were then removed and reapplied. A normal male child of average size was delivered without difficulty. No demonstrable laceration was present.

The placenta was delivered without difficulty approximately ten minutes after the baby was born.

*Prepared by the Maternal Welfare Committee of the Medical Society of the State of North Carolina:

Frank R. Lock, M.D., Chairman	**J. S. Hunt, M.D.**
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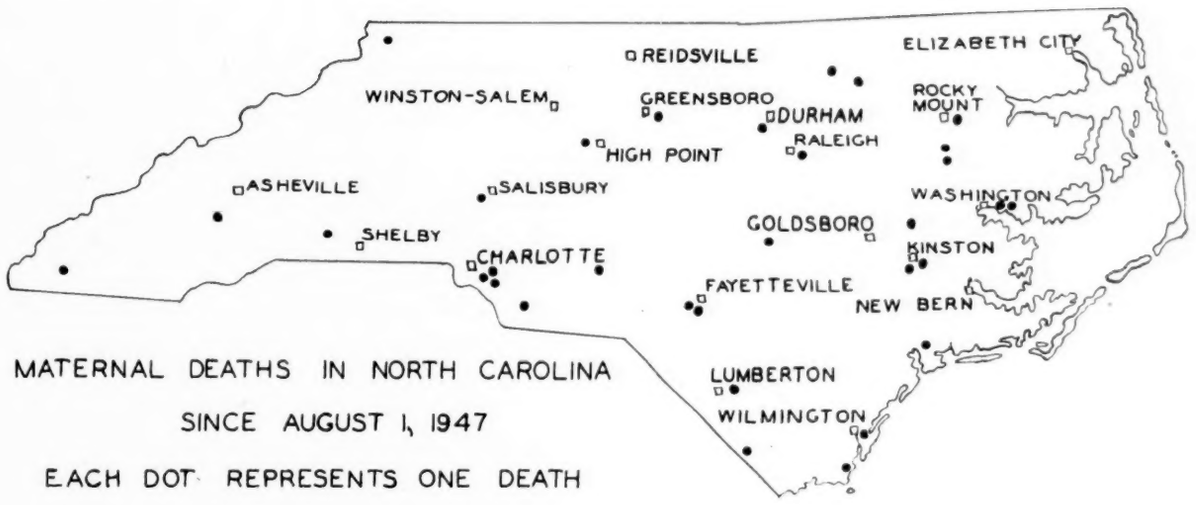

Immediately following the delivery of the placenta, a sudden, profuse hemorrhage occurred. With vigorous massage of the uterus, the physician was able to obtain some contraction of the uterus. Relaxation occurred immediately when he stopped holding the uterus, however, and it became soft and boggy. The physician was unable to control the bleeding for twenty to thirty minutes, and finally checked it by packing the vagina tight with cotton, which was the only available material. The vaginal pack was left in place for eight hours, during which no apparent bleeding occurred. It was then removed, and the decision was made to send the patient to a hospital for a blood transfusion. She died in the hospital, fourteen hours after delivery, before she had been given any blood.

Discussion

The Maternal Welfare Committee considered this death one which should have been easily preventable. That it was not prevented is the fault partly of the patient and partly of the physician. Had the patient sought prenatal care, the history of previous postpartum hemorrhages and grand multiparity certainly would have demanded a hospital delivery with adequate safeguards—compatible blood, uterine packing, and preparations for hysterectomy.

On the other hand, her attendant had sufficient advance information to have taken the above precautions. The Committee realizes that the majority of deliveries in North Carolina are in the home, where adequate facilities are lacking. Whereas this is predominantly a social problem, the physician has a definite responsibility. He must insist that the complicated obstetric cases be hospitalized! Furthermore, it is difficult to understand why adequate packing material was not included in the physician's equipment.

A history of previous postpartum hemorrhage is always significant, and the presence of uterine inertia during the first and second stages of labor predisposes to postpartum hemorrhage. We have repeatedly quoted Eastman's warning concerning the increased danger of pregnancy to a grand multipara. The maternal death rate increases ninefold after the ninth pregnancy.

The Committee considers it an obligation of any physician practicing home obstetrics to be prepared for the management of postpartum hemorrhage, which is certain to occur at times. This preparation includes having readily available oxytocic drugs—posterior pituitary extract and injectable ergot preparations. Blood plasma is stable and should be a part of the obstetric equipment of any physician. A uterine pack, composed of three or four layers of gauze 10 yards in length and 2½ to 3 inches in width, can be kept sterile indefinitely in a hermetically sealed fruit jar and carried for such an emergency. The packing must be placed in the uterus rather than the vagina. A vaginal pack may serve simply to conceal the loss of blood by damming it up in the cavity of a relaxed uterus.

A patient's chance of survival following a profuse hemorrhage of any type bears a direct relation to the time elapsing between the loss of blood and its replacement by transfusion. It is apparent in this case that the physician underestimated the severity of the blood loss, since there was a delay of eight hours before he sent the patient to a hospital for blood transfusion. The fact that she survived, without a transfusion, for an additional six hours after reaching the hospital suggests that she might have been saved if a transfusion had been given as soon as she arrived. Apparently lack of facilities or

personnel, or some other factor, further delayed the transfusion which might have saved her life.

Case 2—N.C.M.W.C. 167

The patient was a white woman, 24 years of age, who was in her second pregnancy. The first terminated in an early spontaneous abortion. Her general condition was excellent; the history, physical examination, and laboratory tests revealed no abnormality. At the thirty-sixth week, she suddenly passed a large amount of bright red blood from the vagina without pain. When she was admitted to the hospital an hour later, the bleeding had stopped and uterine contractions were occurring every five to ten minutes.

Blood was obtained for transfusion as soon as she was admitted to the hospital. She was properly prepared and a sterile vaginal examination was done in the delivery room. The cervix was found to be soft and dilated 2½ to 3 cm. The membranes were intact. The placental edge was felt about 2 cm. from the anterior margin of the cervix. Examination caused no increased bleeding. A vertex presentation was present, the head fitting well into the cervix and pelvis. Rupture of the membranes was selected as the preferred method of treatment. Four hours after admission, a premature, living male child weighing 4 pounds, 11 ounces, was delivered spontaneously. Some bleeding began immediately following delivery, but stopped when the placenta was expressed intact without difficulty. The patient received 500 cc. of whole blood by transfusion.

One hour after delivery she began to have mild bleeding which did not respond to oxytocic drugs and uterine massage, although the uterus was firmly contracted. She was returned to the delivery room, and the uterus and vagina were packed firmly with sterile gauze. A second transfusion of 500 cc. of blood was given while she was in the delivery room. Her pulse rate increased from 100 to 110 and her blood pressure was only 100 systolic, 70 diastolic. For these reasons she was given 500 cc. of plasma and a third transfusion of 500 cc. of whole blood. She was returned to her room in good condition. Half the packing was removed in twenty-four hours, and the other half thirty-six hours after her delivery.

On the second postpartum day, she had a severe chill and her temperature rose to 105 F. She was given penicillin, 50,000 units every two hours intramuscularly, and sulfadiazine, 1 Gm. every four hours orally. Her temperature returned to normal the fourth postpartum day. On the third day, when her blood count revealed a hemoglobin of 60 per cent and 2,830,000 red blood cells, she was given her fourth transfusion of 500 cc. of whole blood.

On the fourth, fifth, and sixth postpartum days, her temperature was normal and her condition excellent. A rise in temperature to 101.4 F. was noted on the seventh day, and recurred on the eighth and ninth postpartum days. Penicillin again was administered. On the tenth postpartum day, she was given a fifth transfusion of 500 cc. of whole blood after it was found that her hemoglobin and red cell count were essentially unchanged by the previous blood transfusions. Later in the day, while using the bed pan, the patient suddenly had a profuse vaginal hemorrhage, filling the bed pan with clots. She went into profound shock, and her blood pressure and pulse could not be obtained. Blood plasma and whole blood were started, one being given in each arm. Her hips were elevated, and a speculum was inserted to determine the point of bleeding. It was observed that the cervix was widely patent, essentially in the condition one would expect immediately **post partum.** When the anterior lip of the cervix was lifted, it became apparent that the old placental site was gangrenous and sloughing, with blood being lost from the entire area. Packing was placed against the bleeding area. Blood and plasma were continued by cutting down on veins in the ankles, and continuous oxygen was given. The patient never improved, however, and ceased to breathe while the fourth pint of blood and second pint of plasma were being given. The bleeding was not completely stopped by the packing, although no further profuse bleeding occurred after it was inserted.

Discussion

It was the opinion of the Committee that this patient was given the benefit of every available medical treatment. The management of placenta praevia lateralis by rupture of the membranes with a spontaneous delivery is completely acceptable and is the most desirable treatment under the circumstances presented by this case. The patient was given transfusions in sufficient quantities, and her death from a delayed postpartum hemorrhage could not have been anticipated.

THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*
DURHAM

OBSTETRICS AND GYNECOLOGY IN AMERICA

X

JAMES PLATT WHITE (1811-1881)

James Platt White, who made great and varied contributions to obstetrics and gynecology, was born in Austerlitz, Columbia County, New York, on March 14, 1811. When he was 5 years of age, his parents moved to East Hamburg in Erie County, an area then frontier. White received a good English education and a fair training in the classics, and began the study of law. Shortly, however, he determined to take up medicine and, after teaching school for a time, entered upon a course of lectures at the medical school in Fairfield, New York. In 1834 he graduated from the Jefferson Medical College in Philadelphia, and the year following he established himself as a practitioner in Buffalo, New York. In this city, which was to be the scene of his long and busy career, he attained almost immediate success in his profession.

Largely as a result of Dr. White's exertions, the medical school of Buffalo was established. In this school, which later became the medical department of the University of Buffalo, Dr. White throughout his life held the posts of president of the council and professor of gynecology and obstetrics. He soon gained a wide reputation as a teacher and was the first to introduce clinical teaching in his classes at a time when theoretical, didactic teaching was the accepted form of student instruction. White's introduction of "demonstrative midwifery" met with violent opposition. In 1851 the American Medical Association's Committee on Education decided that White's clinical illustration of labor was entirely unnecessary for teaching purposes. White held to his practice, however, and was active in its dissemination, being instrumental in the founding of several teaching hospitals.

Thoms, in his work on American obstetrics and gynecology, gives Dr. White priority for the correction of chronic uterine inversion, despite the claims of others for Tyler Smith. Dr. White examined his first patient with chronic inversion of the uterus in 1842. The patient was not operated upon because at that time the leading teachers opposed operation. In 1856 White saw a woman, delivered eight days before by a midwife; the patient had an inverted uterus. Dr. White performed a manual reduction under chloroform, using also a rectal bougie. The reduction was successful, but the patient died of the marked anemia caused by the bleeding at the time of the inversion. White reported the case in the *Buffalo Medical Journal* in March, 1856. In the same year Tyler Smith, using no anesthesia, performed successful replacement of a uterus which had been inverted for twelve years. His report on the case was given on April 13, 1858, before the Royal Medical and Chirurgical Society of London.

In 1866 Dr. White visited Europe and saw Spencer Wells, Tyler Smith, Baker Brown, and other outstanding surgeons perform ovariotomy. In 1867, shortly after his return to Buffalo, he first attempted the operation himself. He soon achieved a wide reputation for skill as an ovariotomist and was frequently called upon to operate in distant parts of the country. He performed 115 ovariotomies in the course of his career.

In 1872, Dr. White described his uterine repositor. Aveling, writing in 1886, gave priority for this innovation to Tyler Smith, basing his decision on the fact that White had used a repositor with a spring. Thoms (1934) again accords priority to Dr. White, however.

Dr. White wrote many scientific articles, and a review of his bibliography is stimulating. He modified the obstetric forceps and advocated anesthesia in childbirth and the use of chloroform in eclamptic convulsions. In 1861 he published a biographic article on Samuel Bard, and in 1863 he prepared the section on pregnancy in Beck's "Medical Jurisprudence." In Buffalo he was instrumental in the foundation of many public institutions: he cooperated with Bishop Timon in the establishment of the Buffalo Hospital of the Sisters of Charity, the maternity and foundling hospitals, and the Providence Asylum for the Insane. He first proposed the founding of the State Lunatic Asylum, was largely responsible for its location in Buffalo, and was at first a manager, afterwards president, of the institution.

Dr. White's death, on September 28, 1881, closed the career of an able clinical teacher and keen investigator, whose true stature is revealed in his many accomplishments.

BAYARD CARTER, M.D.
Duke Hospital,
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The egalitarian philosophy of America proclaims that all men are created equal, and, as the Irishman said, "One man is as good as another, or maybe a little better." In discarding the tradition of an aristocracy by birth, we have thrown out the very notion of quality. Now, plainly, some men are far better than others, for given functions, by hereditary endowment or acquired experience, and the public recognizes this well enough where it is familiar with the situation. It knows that a special combination of endowment and training is needed to make a Joe Louis, a Babe Ruth, or even a Paderewski, and it would rightly scoff at a professor of sociology who pontificated about pugilism. But the reverse is not true. The public does not know sufficient about scientific evidence and procedure to recognize as ludicrous the anthropological antics of Bilbo, the biological blather of Irene Castle ex-McLaughlin, or the chemical confusion of most literary atom bombardiers. The public does not know its scientific A.B.C.'s—and it doesn't know that it doesn't know! Even at the height of scientist prestige, in a technological war, America alone drafted its science students.—R. W. Gerard: Science and the Public, Science 106:24 (July 11) 1947.

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MISSION TO TOKYO

The greatest injustice done the South after the Civil War was not perpetrated by its military conquerors, but by the unscrupulous civilians who came in hordes to profiteer upon the defeated states. As a result of the prostitution of the state legislatures, all sorts of vicious laws were enacted. It has taken the South two generations to recover even partially from this period of carpetbag control.

A rather striking parallel may be drawn between the invasion of the South by the carpetbaggers and a recent invasion of Japan by a group of federal employees. The none-too-thinly disguised purpose of this so-called "mission" is to force upon the conquered Japanese a system of national compulsory health insurance—notwithstanding the fact that such a system has been repeatedly repudiated by the Congress of the United States. In a letter to Mr. Isidore Falk from one of his henchmen in Tokyo (Mr. W. H. Wandel) the statement is made:

"We think that our need is for someone who is primarily not so much an economic analyst as one versed in health insurance. Health insurance is the major field of social security in Japan . . . Permanent revision requires amalgamating National Health Insurance with Health Insurance on a compulsory basis."

Representative Forest A. Harness, in a letter to his colleague John Taber, chairman of the House Committee on Appropriations, protested against the use of federal funds to finance this mission. All the members of the mission are permanent, full-time employees of the federal government and all are recognized as agitators for a national system of compulsory health insurance. In his letter Representative Harness makes eight charges against the Tokyo Health Mission:

"(1) That the health mission to Japan is composed entirely and exclusively of men long identified in the public record as advocates and proponents of Socialized Medicine not only in the United States but throughout the world.

"(2) That the real purpose of this mission is to lay the groundwork for a system of Socialized Medicine in Japan.

"(3) That the scheme for such a mission originated in the Division of Research and Statistics in the Social Security Board in Washington, and nowhere else.

"(4) That the nominal request for the mission was engineered through the General Headquarters of the Supreme Commander in Tokyo by federal employees sent from Washington for that particular purpose.

"(5) That General Douglas MacArthur does not favor—and does not approve—any plan to establish compulsory Socialized Medicine in Japan.

"(6) That the dispatch of this mission to Tokyo for the purpose indicated in Mr. Wandel's letter to Mr. Falk under date of June 14, 1947, is a gross misuse of public funds.

"(7) That the real purpose of the mission is not to assist Japan in working out her basic problems in health and welfare, but to force upon that country a compulsory system of Socialized Medicine.

"(8) That although the questions here involved are of a health and medical nature, the Surgeon General of the United States Army was not consulted in reference to the problems involved."

No doubt most doctors will agree with Representative Harness' comment:

"I deem it inappropriate for federal employees, at the expense of the American taxpayer, to travel throughout the world preparing or assisting in the preparation of legislation to be adopted by foreign countries when similar legislation, long pending, has not been approved by the Congress of the United States."

Let us hope that the Communist fellow-travelers from Washington will not be allowed to do to Japan what the carpetbaggers did to the South after the Civil War.

GOVERNMENTAL SUPPORT FOR RESEARCH

The preeminent place of American medicine in the world today is due in large part to the great number of new discoveries made in this country and the immediate application to practice of those with clinical implication. The educational system which fosters the discovery of new facts and the wide dissemination of new knowledge has as its keystone research. The recent withdrawal of several private philanthropic foundations from the financing of research through grants-in-aid warrants reflection on the causes which have led to this action and on its possible effects. One important cause is the large sums of money being appropriated to federal agencies for research. This factor is leading to a change in the research programs of educational institutions which may not be wise from the long-range point of view.

The success of a research program depends upon the scientific manpower available. The number of scientists who have the peculiar aptitudes required to perform good basic research is strictly limited. The *sine qua non* for a good research scientist is a never-ending succession of ideas which can be subjected to critical scrutiny or experimental evaluation. Individuals with this quality should be encouraged to continue their endeavors and should be protected from the economic necessity of drifting into practice to support their families. Since the number of people able and willing to conduct research is limited, a competition has developed between governmental agencies and private foundations for their services. The government's potentially unlimited funds, drawn from the public's pockets, make this competition so one-sided that the private foundations are leaving the field. At least one foundation has changed its emphasis to the support of individual young investigators—the man rather than the problem. Another foundation is seriously considering withdrawal from the support of any phase of the medical sciences.

The importance of the role of the private foundation should not be judged by the amount of money which it distributes. The total funds available yearly may be small when compared with governmental funds, but they are usually spread widely among many institutions. The scientific director of such a foundation is usually a man of broad vision and experience who can assure continuity in a line of research over a period of years, and can correlate the activities of several investigators in the same field. The foundations tend, unofficially, to familiarize themselves with one another's work, so that duplication is avoided. The pressure upon the scientist to produce immediately apparent results is not great, since the boards of trustees usually do not require justification from the director for continuation of individual grants.

The foundations have recognized that the large educational institutions do not have a corner on brains. They have done much to encourage young investigators working in small and less well known institutions.

Governmental agencies have pursued a different course. During the war dramatic results were often obtained through the use of federal funds when a definite answer to a specific problem of immediate military importance was needed. Such investigations utilized personnel and facilities already operating in medical schools and institutes; the investigations were supported by contracts made with the Office of Scientific Research and Development (OSRD). The success of this program has led the government to presume that the simple appropriation of larger amounts of money will assure a corresponding increase in scientific accomplishments. Nothing is further from the truth; the limiting factor of the availability of trained manpower looms too large.

The success of the OSRD program has tended to focus attention on "practical" research which may have immediate application to clinical practice, rather than on "pure" basic science. Since a bureaucrat must justify his allotment of funds by a record of contributions to medical literature resulting from the investigation, this trend will inevitably be strengthened. Research in pure science may not produce immediate positive results, and hence will receive less support. Similarly, funds will not likely be offered unless the proposed problem promises results; the bureaucrat cannot afford to take a "flyer" on a problem where the return may

be large if the research is successful, but where the risk of complete failure is very great. In spite of the protestations of the governmental agencies that they will support research for its own sake, the scientist is frequently "advised" to slant his application for funds toward the work of the agency with which he is negotiating.

Multiple agencies of the government have money for research which they must spend in a given time to justify a continuation of their appropriations. The large sums of money now becoming available have created a competition between agencies for the distribution of such funds. Since scientists are human, they will be likely to accept funds from the agency offering the most liberal budget, and they may even accept multiple grants from several sources to work on various aspects of the same general problem. The result is that a man may spread his efforts too thin to be most effective, and the quality of his work may drop. In addition, the primary investigator is apt to push young men of promise beyond their capabilities, to avoid losing a governmental grant.

The availability of funds for specific projects tends to lure scientists into fields other than those with which they are familiar. If all the funds requested for cancer research, for example, are appropriated, it is doubtful that enough scientists intimately familiar with the problem are available to spend more than a fraction of the money on ideas of reasonable promise. The amount of money which can be intelligently spent on a given project often is quite small.

The constant shifting of governmental personnel, especially those in military service, prevents the development of administrators with broad experience and knowledge of the capabilities of individual investigators and the trends in research. The lack of familiarity and continuity has led to a tendency to continue support of investigations begun under a previous administrator and to concentrate funds in the large institutions under men of prominent reputation — the big names. Often the evaluation of previous results is not as critical as is the case under private foundations.

The success of the previous government program under OSRD has led to proposals for the establishment of tremendous research institutes by several of the governmental agencies. Continuation of the trend on the scale hinted by the army's request for a $40,000,000 center would seriously disrupt the research program in civilian institutions. The small reservoir of trained personnel in such institutions would be drained, since medical schools and research centers would find it difficult to compete with the government. Easier work, shorter hours, greater facilities, and more liberal retirement and pension plans are potent drawing cards. Furthermore, if the government sets up its own research centers, it may withdraw entirely its support of research projects in private institutions, such as medical schools. These institutions may then find themselves without any financial support, the foundations having previously withdrawn and committed their funds elsewhere.

It would appear, therefore, that the present trend away from dependence on private foundations for support of medical research is not wise. A continued broad interest in scientific investigation by administrators of private funds is urgently needed to prevent its control from passing to the government by default.

* * * *

DR. WILLIAM SEAMAN BAINBRIDGE

The passing of Dr. William Seaman Bainbridge of New York City, on September 22, leaves only six men in the United States who can claim the distinction of being honorary members of the Medical Society of the State of North Carolina: Drs. James K. Hall, Paul V. Anderson, and Stuart McGuire, of Richmond; Dr. R. L. Payne, Jr., of Norfolk; Dr. Fred Rankin, of Lexington, Kentucky; and Dr. William Sharpe, of New York.

Dr. Bainbridge was a lifelong student, a medical philosopher, and a charming companion. The NORTH CAROLINA MEDICAL JOURNAL for December, 1944, published one of his last papers, "Our Debt to the Aging" —an address to the second meeting of the American Geriatrics Society. Those who have a copy of that issue will be well repaid for reading this article over again.

In Dr. Bainbridge's passing American surgery loses a distinguished representative, and the Medical Society of the State of North Carolina loses a good friend.

Clinicopathologic Conference

BOWMAN GRAY SCHOOL OF MEDICINE
OF WAKE FOREST COLLEGE

The patient was a 48-year-old white male who entered the North Carolina Baptist Hospital for the first time on December 2, 1946. He had been in good health until six months previously, when he first noted nodules in the right side of the neck, together with malaise and fever up to 101 F. Because of these symptoms he consulted his local physician. A biopsy of a node from the neck was reported as showing Hodgkin's disease. The patient's weight had fallen from 145 to 118 during the past six months, and he had had pruritus over various parts of his body for this length of time. The areas of skin involved usually showed small papules. He was given twenty-six x-ray treatments over various portions of the body during a period of two months. He entered the hospital because of dull aching pain in the left lower quadrant of the abdomen. He had also had pain in the left upper quadrant and mid-epigastric region after meals at times for the past year. He belched a great deal and occasionally vomited.

Physical examination revealed a poorly nourished male. A few cervical lymph nodes were palpable. Axillary nodes were small but easily felt. Inguinal and femoral nodes were enlarged and firm. There were several small nodes on the left side of the abdomen which were easily movable. The lungs were clear. The liver and spleen were not palpable.

Urinalysis was essentially negative. The hemoglobin was 13 Gm., the white cell count 11,000. Serum proteins were 6 Gm. per 100 cc. An x-ray of the chest showed the right lung field to be clear. There were several nodular areas of increased density in the left upper lung field with fibroid changes radiating toward the hilar region and the extreme apex. These changes were compatible with the diagnosis of Hodgkin's disease.

The patient was treated with antireticular cytotoxic serum, being given 0.5 cc. on December 6, 1 cc. on December 9, and 1.5 cc. on December 12. He was discharged, symptomatically improved, on December 13, 1946.

The patient entered the hospital again on January 2, 1947, for further therapy with antireticular cytotoxic serum. Physical examination revealed a few small, hard, discrete nodules in the right cervical region and in both inguinal regions. The axillary glands were not palpable. The lungs were clear. The liver and spleen were not palpable. In the left upper quadrant there was a hard, fixed, non-tender mass about the size of a small egg. There were also some small, ill-defined masses palpable in the epigastric area. The patient was discharged on January 12, after receiving the serum.

He entered the hospital for the third time on May 13, 1947. He had lost about 12 pounds in weight since February. Three and a half months before this admission, an abscess had developed near the anus and had drained spontaneously until the first week of May. He had continued to have a poor appetite, but had noted no melena. He had had a slight cough productive of about an ounce of grayish sputum per day, since an upper respiratory infection on April 20. There had been no hemoptysis and no chest pain.

Physical examination revealed a moderate dacryocystitis on the left. The lymph nodes had not changed. Examination of the chest revealed bilateral wheezing inspiration and expiration, especially at the apices, and a few coarse rales at the apices. The liver and spleen were not felt, and no abdominal tenderness was noted.

The urine showed a faint trace of albumin and occasional white blood cells. The Fishberg test showed a maximum concentration of 1.031. The hemoglobin was 12.5 Gm., the red cell count 4,250,000, the sedimentation rate (corrected) 36 mm. in an hour, and the white cell count 12,900 with 78 per cent segmented polymorphonuclears, 2 per cent nonsegmented, 1 per cent eosiniphils, 1 per cent basophils, 12 per cent lymphocytes, and 6 per cent monocytes. The nonprotein nitrogen was 33 mg. per 100 cc., the total serum proteins 5.8 Gm. (albumin 3.5 Gm., globulin 2.3 Gm.). The Kahn test was negative, and the stool examination was negative.

An electrocardiogram was reported as showing no evidence of myocardial disease. An x-ray of the chest made on May 14 showed a mottled density in the left apex extending to the lower body of the second rib, which appeared somewhat honey-combed in type. There was also a minimal amount of similar infiltration in both bases. The report stated: "The nature of this infiltration

cannot be definitely determined by x-ray alone. The location of the lesion in the left upper field suggests the possibility of tuberculosis. Scattered areas of rarefaction are seen in several of the ribs bilaterally. The significance of this finding is not evident." X-rays of the chest on May 19 and June 18 were reported as being unchanged. An x-ray of the chest on June 23 showed a spreading of the previously described bilateral pulmonary infiltration. The x-ray diagnosis was "probable tuberculosis, spreading."

The patient's temperature ranged between 99 and 102.4 F. rectally, and his pulse rate remained elevated. Many concentrated sputum examinations were done for acid-fast bacilli, and on May 15, 20, and 21 several acid-fast bacilli were found. His main complaint throughout the hospital stay was increased dyspnea. He developed moderate edema of the presacral area, of the lower extremities, and of the hands. The total serum proteins on June 6 were 5.2 Gm., with an albumin-globulin ratio of 2.2. The patient was digitalized five days prior to death, but with little improvement. He died quietly on June 26.

Discussion

DR. DAVID CAYER: This 48-year-old man entered the North Carolina Baptist Hospital in the sixth month of a progressive, fatal illness of one year's duration. His history at that time may be summarized by stating that, following the appearance of enlarged lymph nodes in the right side of the neck, which his local physician found to be a manifestation of generalized lymphadenopathy, his illness was characterized by malaise, low-grade fever, and progressive weight loss. It would be of some help to know whether or not the liver or spleen was palpable at the onset, as well as how much x-ray therapy was given, whether it was directed over the liver or spleen, whether a chest plate was made, and, if so, what the findings were. This information, however, is not available.

At the time of admission here the patient's complaints were largely referable to the gastrointestinal tract, and consisted of pain in the left side of the abdomen, epigastric discomfort after meals, and occasional vomiting. These symptoms direct our attention to the abdomen and gastrointestinal tract, and to a consideration of the possibility that they may have represented a primary malignancy in the abdomen, rather than a part of the clinical picture already diagnosed by biopsy as Hodgkin's disease. The most frequent abdominal malignancies can be fairly well ruled out on the basis of the history and findings at the time of admission. Carcinoma of the stomach, which would be the most likely malignant lesion on the basis of frequency, is ruled out by the primary lymph node enlargement in the right side of the neck. The thoracic duct drains the abdomen and is responsible for the appearance of nodes in the left side of the neck, particularly the so-called Virchow's node. There is no direct lymphatic connection from the abdomen to the right side of the neck, and therefore the right-sided lymph node enlargement without anemia or the finding of occult blood in the stool would make carcinoma of the stomach unlikely. Carcinoma of the body of the pancreas can be ruled out by the same reasoning. The absence of a previous history suggestive of chronic cholecystitis or cholelithiasis, as well as the duration of the illness without liver enlargement or jaundice, would rule out gallbladder malignancy, since local metastases are early and most common. The negative stool findings and the lack of anemia or manifestations of obstruction or toxicity also pretty well eliminate the possibility of a primary cancer of the colon or rectum.

The patient was admitted in December and again in January for treatment with antirecticular cytotoxic serum. Dr. George Harrell and members of the medical house staff have been interested in using this in Hodgkin's disease, and I hope he will say a few words on the subject. The patient's course after he was discharged from the hospital was progressively downhill. He continued to lose weight and developed an abscess near the rectum which drained for several months. In view of the terminal pulmonary findings, we might conjecture that this represented a tuberculous abscess. The duration of drainage would fit this impression, but in the absence of smears or cultures an absolute diagnosis can not be made.

It is worthy of note that during the six months the patient was observed in this hospital his laboratory findings underwent little change. The hemoglobin remained at approximately 80 per cent and the red cell count at 4,250,000. The white cell count

changed little, although the sedimentation rate was indicative of infection or malignancy, or perhaps both. Although the total serum proteins showed a slow but progressive fall, other examinations of the blood, as well as stool examinations, urinary concentration studies, and an electrocardiogram were within normal limits. X-ray examinations of the chest showed a progressive pulmonary infiltration which was most suggestive of tuberculosis. This impression was confirmed by the demonstration of acid-fast bacilli in concentrated sputum specimens on three separate occasions.

It seems, then, that the clinical data, as well as the accessory studies reported from the departments of pathology and roentgenology, substantiate two diagnoses in this case—*Hodgkin's disease* and *pulmonary tuberculosis*.

The repeated inability to palpate the spleen would make one somewhat suspicious of the former diagnosis, since splenomegaly is demonstrable clinically in about 75 per cent of patients with proven Hodgkin's disease. The absence of this finding does not, however, rule out this condition.

The simultaneous occurrence of Hodgkin's disease and tuberculosis is not uncommon. About six months ago at a clinicopathologic conference I made a similar diagnosis, which proved to be only half right, when Dr. Thomas presented an instance of histoplasmosis and pulmonary tuberculosis[1]. Following that conference I reviewed Dr. Parsons' excellent paper on histoplasmosis[2] and was impressed with the marked clinical similarity of Hodgkin's disease and histoplasmosis. Several of the cases reported by the author had histories which could easily be substituted for that which was given here. In several instances histoplasmosis was found to be associated with pulmonary tuberculosis, and in one case with Hodgkin's disease. The author states that the diseases which must be most frequently differentiated from histoplasmosis are tuberculosis and Hodgkin's disease, as well as aleukemic leukemia and malignant neoplasms. Although histoplasmosis might be a possibility in this case, I would be most reluctant on the basis of probability alone to make such a diagnosis.

1. Cayer, David and Thomas, W. C.: Clinicopathologic Conference, North Carolina M. J. 8:42-46 (Jan.) 1947.
2. Parsons, R. J., and Zarafonetis, C. J. D.: Histoplasmosis in Man, Arch. Int. Med. 75:1-23 (Jan.) 1945.

The gastrointestinal complaints which first brought the patient to the North Carolina Baptist Hospital are possibly unrelated to either Hodgkin's disease or tuberculosis. Tuberculosis of the stomach is said to be one of the rarest of tuberculous lesions, and Bockus speaks of Hodgkin's disease of the stomach as "exceedingly rare." It is entirely possible that this man had a related or even an unrelated disease of the stomach, but the clinical data will not justify a more specific diagnosis.

I do not see how the clinical manifestations of generalized lymph node enlargement, fever, progressive weight loss, pruritus, and papular involvement of the skin, as well as the roentgenographic changes in the lungs and the finding of acid-fast bacilli in the sputum on three separate occasions, can be interpreted except to make the diagnoses of (1) *malignant lymphoma of the Hodgkin type*, and (2) *pulmonary tuberculosis*.

Dr. Cayer's diagnoses

Malignant lymphoma of the Hodgkin type
Pulmonary tuberculosis

DR. GEORGE T. HARRELL (Internist): The etiology of Hodgkin's disease has been a source of controversy. The disease is thought by some investigators to be due to a tumor, while others have favored an infectious etiology. Many varied organisms have been recovered from the lymph nodes in Hodgkin's disease; it is generally agreed that the tubercle bacilli found in some instances are secondary invaders which have settled out in damaged tissue. Whether the Brucella recovered from patients with Hodgkin's disease represent the primary etiologic agent or a secondary invader is still a moot point[3]. It was hoped that the studies with antireticular cytotoxic serum (ACS) might shed some light on this controversy.

It is a well-known biologic fact that harmful substances administered in small doses may have a stimulating rather than a toxic effect. This principle is true in the administration of drugs. Bogomolets, a Russian, prepared an antiserum using reticulo-endothelial cells as the antigen[4]. He assumed

3. Forbus, W. D., Goddard, D. W., Margolis, G., Brown, I. W., and Kerby, G. P.: Studies on Hodgkin's Disease and Its Relation to Infection by Brucella (Abstract), Am. J. Path. 18:745-748 (May) 1943.
4. Bogomolets, A. A.: Anti-Reticular Cytotoxic Serum as a Means of Pathogenetic Therapy, Am. Review of Soviet Med. 1:101-112 (Dec.) 1943.

that the antibody resulting from injection of this antigen was specific against this type of tissue cell. On the basis of this theory, the administration of such an antiserum in stimulating doses should make the patient worse if Hodgkin's disease is a tumor. If the disease is an infection, the stimulation of the phagocytic cells should result in clinical improvement which might be confirmed by objective evidence. Since Brucella have been recovered from cases of Hodgkin's disease in North Carolina[3], a study of the immune status of patients with the disease, before and after the administration of ACS, was done. The initial report on the studies was made to the Southern Medical Association in November, 1945.

Various physiologic studies were also done to observe the effect of ACS on patients with Hodgkin's disease. The number of mononuclear cells in the blood, the stimulation of tissue macrophages—as judged by the spread of a particulate dye—, the size of histamine wheals, the changes in the sedimentation rate and Weltman reaction, and the serum proteins were followed. No change was found in the status of immunity to Brucella. Minimal changes were found in the sedimentation rate; showers of monocytes were observed, but such showers occur spontaneously in other diseases of the reticulo-endothelial system, such as sarcoid.

Clinically several patients appeared to obtain temporary benefits from the administration of the serum, as judged by increase in the sense of well-being and by the ability to return to work. One patient had an exacerbation of symptoms and died very quickly following the administration of the serum. The patient under discussion tonight noted little change.

The principle involved in the use of this material is extremely fascinating. One would usually interpret results obtained from serum prepared in this fashion as being due to an effect against a species of animal—the human being—, rather than an effect against a particular type of cell. Additional studies must be done before a definite opinion on the value of ACS in the treatment of Hodgkin's disease can be given.

DR. LUTHER JARVIS (Roentgenologist): Serial films of the chest over a period of nine months prior to the patient's death showed progressively increasing, soft, patchy infiltrations in the left upper lobe, which, at the onset, had the appearance of residual fibroid changes from either tuberculosis or a treated Hodgkin's disease. During the last month the disease became widespread and involved the right lung. There was no apparent mediastinal lymphadenopathy. The pulmonary changes could be due to tuberculosis, Hodgkin's disease, or a combination of the two.

Anatomic Discussion

DR. W. C. THOMAS: The anatomic findings in this case were widespread, but involved chiefly the reticulo-endothelial system. The mesenteric and preaortic lymph nodes were enlarged to the size of walnuts; the capsules of the lymph nodes were somewhat adherent. Both lungs presented areas of consolidation and cavitation; grayish-white miliary lesions were noted in some portions of the lung tissue. The liver and spleen presented grayish-white miliary foci on their cut surfaces. The wall of the stomach appeared to be thickened; an ulcer measuring 1 cm. in diameter was found on the lesser curvature of the stomach 2 cm. from the pyloric end.

Microscopic examination showed typical tubercles, containing acid-fast bacilli, in the lungs, spleen, and liver. In other portions of the lungs, liver, spleen, and stomach, and in the lymph nodes of the mesenteric and preaortic regions, there was a granulomatous reaction characterized by eosinophilia, fibrosis, and the presence of giant cells of the Reed-Sternberg type.

This case illustrates the difficulty in separating the effects of a specific disease, such as tuberculosis, on the reticulo-endothelial system from those of a clinical syndrome involving the reticulo-endothelial system, as is noted in Hodgkin's disease. The whole question of the specificity of tissue reactions is raised by a case of this type. It is obviously not answerable unless one assumes a broad biologic and philosophic point of view. The inter-relationship of tuberculosis and Hodgkin's disease has been the subject of numerous papers in the past few decades.

Anatomic Diagnoses

Tuberculosis, miliary, involving the liver and spleen; tuberculous bronchopneumonia of both lungs with cavitation.

Hodgkin's disease, diffuse, granulomatous, of the lungs, lymph nodes, liver, spleen, and stomach.

MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.
RALEIGH

NEGLIGENCE: *A physician is not absolved from liability solely because he was not engaged or retained by the patient himself. A mistake in diagnosis is actionable if the physician is negligent in making the examination.*

In this case a physician was sued for making an error in diagnosis. The records show that the doctor was summoned by a county official to attend a man who was arrested, allegedly, because of drunkenness. At the time the doctor visited the prisoner, he was confined to the common jail of the county where the arrest occurred. The prisoner died on the day following his arrest and confinement. It was contended by the widow of the decedent, who was also the administratrix of his estate, that the doctor attended her husband (the alleged inebriate) on two occasions and spent only four or five minutes with him each time. She set forth facts tending to show that he was negligent in making his examination, and that as a consequence her husband's death was due to the lack of proper treatment. A postmortem examination and chemical analysis of the vital organs revealed no alcohol in the body of the decedent, but did show that there was (1) complete coronary occlusion of the descending left branch; (2) terminal dilatation of the heart; (3) chronic fibrous myocardial changes with brown atrophy; (4) acute terminal pulmonary edema; and (5) a small hemorrhage in the right cerebral lobe.

In superior court the lawyer for the defendant physician made a motion to dismiss the case, insisting that the physician had never been engaged or retained by the decedent and that a doctor is not liable for a mistake in diagnosis. The judge allowed the motion upon the assumption that no cause of action was contained in the complaint.

The widow thereupon appealed to the Supreme Court. The appellate court was of the opinion that the physician was not absolved from liability to the patient or to the administratrix of his estate solely because he was not personally engaged and retained by the deceased man. The court stated further that it had been held in other cases that "a physician or surgeon who renders services gratuitously does not effect his duty to exercise reasonable and ordinary care, skill and diligence." The court also held that a doctor is liable for a mistake in diagnosis unless the examination is such as is approved and practiced by medical men of ordinary learning, judgment and skill in that community or similar localities.

The judgment rendered in superior court was set aside, and the case was remanded for new trial.

The point to remember here is that when a physician accepts a case for treatment he is legally required to utilize every resource at his command in arriving at a diagnosis and instituting the proper form of therapy. This rule of law applies in cases where the patient himself engages the services of the doctor, in cases where others do so for him, and in instances where the work is done gratuitously. (Michigan Supreme Court, April, 1947. V. 26 Northwestern Reporter, p. 755.)

Final Edition of "Courage and Devotion Beyond the Call of Duty"

The final edition of the book, "Courage and Devotion Beyond the Call of Duty," which is composed of official awards and citations received by U. S. medical officers during World War II, is now being prepared by Mead Johnson & Company, Evansville, Indiana.

Any physician, who has not already done so, should write to Mead Johnson & Co. advising them of the awards he has received and also send a typewritten or photostatic copy of his citations. The following additional information would be of assistance in compiling the material for this book: Present rank or rank at time of discharge. Branch of service. From what university and in what year M.D. degree was received. Date of entry into the service.

Winthrop-Stearns, Inc., Formed to Integrate Sterling's Major Pharmaceutical Interests

Formation of Winthrop-Stearns, Inc., as a new subsidiary to integrate the major pharmaceutical interests in the United States of the parent company was announced recently by Sterling Drug Inc., through James Hill, Jr., president. The new company, Mr. Hill said, will conduct the business hitherto carried on by Winthrop Chemical Company, Inc., organized by Sterling in 1919 and now being liquidated, as well as the pharmaceutical operations of the Frederick Stearns & Company Division, Detroit, organized in 1855 as Frederick Stearns & Company.

Dr. Theodore G. Klumpp has been elected president of Winthrop-Stearns Inc.

Dr. Glenn E. Ullyot of Philadelphia, head of organic chemical research at Smith, Kline & French Laboratories, pharmaceutical manufacturers in Philadelphia, was elected vice chairman of the Division of Medicinal Chemistry of the American Chemical Society.

TUBERCULOSIS ABSTRACTS

A Review for Physicians

Issued Monthly by the National Tuberculosis Association

Vol. XX October, 1947 No. 10

A WIDE segment of our adult male population had chest X-rays at induction into the Armed Forces. Unsuspected abnormalities of the lungs, mediastinum, thoracic cage and heart were disclosed, many in a presymptomatic stage. The most fruitful result of these surveys, however, has been the discovery of early pulmonary tuberculosis. In this age group, carcinoma of the lung was rarely encountered, but in the present surveys of industrial groups one of the lesions coming to light is asymptomatic circumscribed carcinoma of the lung.

CARCINOMA SIMULATING PULMONARY TUBERCULOSIS

The roentgen appearance of a circumscribed pulmonary carcinoma may be simulated by a solitary noncavitary tuberculous focus. In any large series of pneumonectomies for bronchial carcinoma, there will be cases in which lungs containing an isolated, large, tuberculous nodule have been excised. In the two cases reported here, the situation was reversed. These patients were treated for pulmonary tuberculosis for many months before the neoplastic nature of the lesions was recognized.

Case 1: A 61-year-old man had a roentgen film of his chest made in an industrial survey in December, 1943. He was told that he had a tuberculous lesion and was referred to his family physician. After further X-ray study, the physician agreed with this diagnosis. The film showed a faint amorphous density, about 2 cm. in diameter, in the subapical portion of the right upper lobe. The mesial and lower borders of the density appeared somewhat rounded and it faded off laterally into several streaks. A lateral film showed that the lesion was located in the posterior portion of the lobe, a predilection site for early tuberculosis. A chest film made routinely three years previous had disclosed normal lung fields.

He was sent to a tuberculosis institution but no tubercle bacilli could be found in specimens of gastric contents. Since he remained free of symptoms and the lesion appeared unchanged, he was discharged after eight weeks. Four months later, the lesion appeared denser and was 3 cm. in diameter. One month later there was further increase in the size and density of the lesion. The borders were sharper and the diameter measured about 4 cm. Another physician then thought that the patient had a circumscribed pulmonary carcinoma.

On admission to the hospital the patient was found to be well nourished. Physical examination showed no abnormality aside from slight clubbing of the fingers. Tubercle bacilli could not be demonstrated and bronchoscopy did not reveal abnormal findings.

The chest was explored on July 12, 1944. A walnut-shaped mass was palpated in the right upper lobe which was removed, together with the adherent right middle lobe and the regional lymph nodes. On section, the tumor was found sharply circumscribed and proved to be an epidermoid carcinoma. The lymph nodes showed no tumor cells. There was no evidence of a tuberculous lesion. There was no recurrence of the tumor two years after operation.

Circumstances leading to the correct diagnosis in the second case parallel those of the first.

Case 2: A woman of 43 had an industrial chest survey film made in April, 1944. A right upper lobe lesion was found and, after study, the patient was told that she had arrested pulmonary tuberculosis. There were no pulmonary symptoms. The shadow was faint, appeared oval-shaped and measured about 2 cm. in diameter. Its outer border was hazy and several streaks extended from it peripherally. Since tubercle bacilli could not be demonstrated in the body secretions, the patient was allowed to return to work.

Six months later a film revealed a few moth-eaten areas of lesser density within the shadow, but the size was unchanged. Three months later, the shadow was larger and stood out more sharply from the surrounding lung parenchyma. Eight months later the shadow measured 4 cm. in diameter. Her physicians decided that she had active tuberculosis and recommended sanatorium care. She consulted another physician who thought that her film series indicated the presence of a slow-growing circumscribed neoplasm.

On admission to the hospital, the patient had no complaints and physical examination disclosed no abnormalities. No other primary site could be found nor was there any evidence of distant metastatic lesions. A posterior-anterior view of the chest showed a dense oval shadow in the right upper lobe. The lateral chest film showed the lesion to be located in the posterior portion of the upper lobe and sectional radiography disclosed several irregular areas of decreased density within it.

The first attempt to explore the chest was abandoned because the patient went into severe shock. At the second operation two weeks later a partial lobectomy of the portion of the lobe containing the tumor was performed. No involvement of the lymph nodes, pleura or chest wall was noted.

Grossly, the specimen showed a well circumscribed oval neoplasm; in its center were several small areas of necrosis; it was an adenocarcinoma. A small bronchopulmonary lymph node showed no tumor cells. No tuberculous lesions could be found.

These two cases point up some of the difficulties in differentiating a slow-growing circumscribed neoplasm of the lung and a solitary tuberculous focus, particularly when the lesion is situated in the upper lobes. A proper evaluation of the alterations in the appearance of the lesion on successive films was crucial in both these cases, since neither of the patients had any symptoms. Circumscribed bronchial carcinoma may be silent for a prolonged period and, in this respect, behaves like many cases of early pulmonary tuberculosis.

At the present time, physicians are aware that pulmonary tuberculosis produces few symptoms and signs at its onset and that the diagnosis must be made in this stage if the chances of recovery are to be maximum. This is no less true of the circumscribed varieties of bronchial carcinoma. Mass surveys and routine chest roentgenography are becoming the important methods by which operable pulmonary cancers are discovered. The two cases reported here were mistaken for pulmonary tuberculosis for seven and sixteen months, respectively, before they were admitted to a hospital for surgery.

Carcinoma Simulating Pulmonary Tuberculosis, Louis E. Siltzbach, M.D., The American Review of Tuberculosis, Feburary, 1947.

BULLETIN BOARD

MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA

Minutes of Meeting of Certain Committees with the Executive Committee September 7

A number of the committees of the Medical Society of the State of North Carolina met in joint session with the Society's Executive Committee on Sunday morning, September 7, at Sedgefield Inn, near Greensboro. The meeting was called to order at 11:30 a.m. by President Sharpe, who presided.

The following members were present:

Officers:....

Dr. Frank A. Sharpe, president, Greensboro.
Dr. J. F. Robertson, president-elect, Wilmington.
Dr. V. K. Hart, first vice president, Charlotte.
Dr. J. G. Raby, second vice president, Tarboro.
Dr. Roscoe D. McMillan, secretary-treasurer, Red Springs.

Councilors:

Third District—Dr. Donald B. Koonce, Wilmington
Fifth District—Dr. John N. Robertson, Fayetteville
Seventh District—Dr. Elias S. Faison, Charlotte
Eighth District—Dr. James H. McNeill, North Wilkesboro
Ninth District—Dr. Irving E. Shafer, Salisbury
Tenth District—Dr. D. M. McIntosh, Sr., Old Fort

Committee Chairmen and Members:

Dr. V. M. Hicks, Raleigh
Dr. Wingate M. Johnson, Winston-Salem
Dr. G. Westbrook Murphy, Asheville
Dr. R. B. Davis, Greensboro
Dr. Frank C. Smith, Charlotte
Dr. Rowland T. Bellows, Charlotte
Dr. Verne S. Caviness, Raleigh
Dr. Harry Winkler, Charlotte
Dr. Hugh A. Thompson, Raleigh

Others:

Mr. J. T. Barnes, executive secretary, Raleigh
George Pennell, Esq., attorney at law, Asheville

President Sharpe introduced Mr. J. T. Barnes, the new executive secretary, and then called on Dr. Hart to outline the progress of his committee, which was to study the matter of hospital, medical, and surgical insurance, and make recommendations. Dr. Hart reported that the members of the committee were at work preparing tentative fee schedules and that the first called meeting of the committee would be held on November 1 and 2. The matter of adding to the committee representatives for the fields of dermatology and diseases of the chest was discussed, and the decision was left to Dr. Hart .

Dr. Koonce, chairman of the Public Relations Committee, outlined his committee's plan of procedure as follows:

1. To handle all publicity through the executive secretary, Mr. Barnes.
2. To create an annual scholarship competition for high-school students, with a scholarship not to exceed $600 to be awarded to the student who presents during the year the best paper or declamation on the relations between the medical profession and the public.
3. To present a plaque or some other award to the county medical society which contributes most toward good public relations during the year. County medical societies would be encouraged to sponsor addresses by medical men to civic and religious clubs and groups, and to appoint a local committee to control the local press notices—to stress the favorable ones and to try to subdue as much as possible the unfavorable ones.
4. Possibly to have an article on public relations written for the **North Carolina Medical Journal** each month by a well-known layman or doctor.

Dr. Koonce requested the Executive Committee's approval of the second and third items listed above. After some discussion, Dr. Shafer moved that this approval be granted. Dr. McNeill seconded the motion, and it was passed unanimously.

Dr. Robertson, chairman of a committee appointed to visit Dr. Graham and discuss with him the matter of selection of the faculty for the four-year medical school of the University of North Carolina, reported that the committee met with President Graham at his home about two months ago, and that they found him most cooperative and appreciative of the Society's interest. He asked for definite instructions as to the committee's next move. Dr. Koonce moved that the committee be instructed to ask President Graham's permission to have committees representing the different specialties confer with him upon the selection of professors for the four-year medical school. The motion was seconded by Dr. Shafer and, following some discussion, was carried.

Secretary McMillan stated that Dr. J. Gaddy Matheson, councilor of the First District, had resigned, and had recommended that Dr. Zack D. Owens, of Elizabeth City, be appointed to fill out his unexpired term. Upon motion, duly seconded and carried, the appointment of Dr. Owens was confirmed.

The secretary then read a letter from Mr. Lee L. Gravely, chairman of the board of directors of the North Carolina Sanatorium for Tuberculosis, in regard to the location of additional beds for tuberculosis patients. Dr. Shafer moved that Dr. W. M. Coppridge be appointed to confer with the board of directors about the matter. The motion was seconded by Dr. Robertson and carried unanimously.

Secretary McMillan then discussed plans for the 1948 meeting of the State Society, which is to be held in Pinehurst May 3, 4, and 5.

Dr. V. M. Hicks, chairman of the finance committee, read the following report regarding the salary and duties of Mr. J. T. Barnes, the executive secretary:

"The committee charged with the employment of an executive secretary completed its work by employing Mr. J. T. Barnes at an annual salary of $5,400.

"A special committee composed of the following: (1) Dr. Frank A. Sharpe, president, chairman; (2) Dr. Roscoe D. McMillan, secretary-treasurer; (3) Dr. V. M. Hicks, chairman of the Finance Committee; and (4) Dr. Wm. M. Coppridge, past president, was charged with the duty of defining the work of the executive secretary and recommnding to the Executive Committee the amount or rate to be paid him for travel and other expenses.

"We wish to submit the following recommendations:

"1. That the first few months of his employment be devoted to acquiring all knowledge possible of our organization, both in the secretary's office and by contacts with the present officers of the Society. We feel that it is necessary for him, as rapidly as possible, to meet with all committees of the Society, all district societies, and as many county societies as possible.

"2. It will be desirable for him to visit other state society executive offices, such as those in West Virginia and Connecticut, or others that have outstand-

ing organizations. A visit to the offices of the American Medical Association would be desirable.

"3. He shall become familiar with the workings of the State Board of Medical Examiners, State Board of Nurse Examiners, State Hospital Association, the **North Carolina Medical Journal**, the State Board of Health, and other organizations with which our Society has common interest.

"4. The executive secretary shall work out of the present office of the secretary-treasurer, under the direction of the present secretary-treasurer together with the president and the president-elect. This will not necessitate his residence at any special place.

"5. We recommend that expenses incurred in travel other than by automobile be paid to the executive secretary on the basis of actual expense incurred and that he submit to the secretary-treasurer, the president, and the president-elect a statement on the first of each month of such expenses. For automobile travel (with the executive secretary furnishing and maintaining his own car) he shall be paid at the rate of—(to be determined later). The matter of length of vacation, hours of work, or other details of his duties will be decided by the above-named committee—the president, the president-elect, and the secretary-treasurer."

A motion to adopt the report was seconded and carried.

Dr. G. Westbrook Murphy, chairman of the Special Committee on the Workmen's Compensation Act, reported on the progress that had been made by the committee since the House of Delegates voted at Virginia Beach to withdraw the Medical Advisory Committee to the Industrial Commission, withhold all official approval of the methods of administration of the Workmen's Compensation Act, and appropriate sufficient funds (subject to the approval of the Executive Committee) to take to the courts the question of the administration of the Workmen's Compensation Act. He stated that the committee appointed by Dr. Sharpe (Dr. R. B. Davis of Greensboro, Dr. Frank C. Smith of Charlotte, Dr. Hugh A. Thompson of Raleigh, Dr. Rowland T. Bellows of Charlotte, Dr. M. H. Greenhill of Durham, Dr. A. C. Ambler of Asheville, Dr. Verne S. Caviness of Raleigh, Dr. T. R. Huffines of Asheville, Dr. Harry Winkler of Charlotte, and Dr. G. W. Murphy of Asheville, chairman) recommends that the Executive Committee authorize the taking of the matter to the courts of North Carolina for settlement. Mr. George Pennell of Asheville, the lawyer whom the committee had consulted, was present and was given the courtesy of the floor. He stated that the best plan of procedure would be to bring several cases to court to test the validity of different points of the law. If a case is carried to the Supreme Court, the question will be decided, once and for all. If the law is found to be utterly and inherently wrong, it would be necessary to have it amended or repealed by the General Assembly of North Carolina. He brought out the fact that the Insurance Commissioner's report shows that $4,000,000 in profits is paid annually to the industrial insurance companies in North Carolina.

In the discussion which followed, Dr. R. B. Davis quoted Mr. Pennell as saying that about forty states have an industrial insurance law, and that about eight have tested it. In six cases out of the eight the Supreme Court's ruling was in favor of the medical society.

Following a lengthy discussion, Dr. Faison moved the adoption of the following resolution: "RESOLVED, that the Executive Committee of the Medical Society of the State of North Carolina endorse the proposal made by the Special Committee on the Workmen's Compensation Act and that the said committee be authorized and empowered to proceed with the plan as outlined here; and BE IT FURTHER RESOLVED that the Executive Committee authorize the expenditure, for such purpose, of funds not to exceed $1,500."

The motion was seconded by Dr. McNeill and carried unanimously.

The meeting then adjourned at 4 p.m., and the Executive Committee went into executive session.

Executive Session

President Sharpe called the meeting to order and asked Secretary McMillan to state the business at hand.

Secretary McMillan requested authorization from the Executive Committee to add to the budget the expenditures entailed by the actions of the preceding meeting—the salary and traveling expenses of the executive secretary, the $600 for the scholarship authorized to be established by the Committee on Public Relations, and the $1,500 for the Committee on the Workmen's Compensation Act. Vice-President Hart offered the following motion:

"BE IT RESOLVED that the Executive Committee of the Medical Society of the State of North Carolina authorize the following additional expenditures, over and above the budget adopted at the annual meeting of the Society at Virginia Beach in May, 1947: (1) $1,500 for the use of the Committee on the Workmen's Compensation Act; (2) $600 for the scholarship to be established by the Committee on Public Relations and the plaque to be awarded by that committee to the county medical society doing the best work in public relations; (3) $5,400 for the salary of the executive secretary of the Society, plus reimbursement for his expenses as recommended by the committee on the establishment of an executive secretary.

The motion was seconded and carried unanimously, and the Executive Committee adjourned at 4:20 p.m.

Regional Meeting of the American College of Physicians

The North Carolina Regional Meeting of the American College of Physicians will be held at Chapel Hill on November 14, 1947, with the University of North Carolina as hosts. The program for the afternoon session, which will begin at 2 p.m., is as follows:

"The Shoulder Hand Syndrome"—Elbert L. Persons, M.D., Duke University School of Medicine

"Tropical and Parasitic Infestations in Veterans and Civilians in North Carolina"—Thomas T. Mackie, M.D., Bowman Gray School of Medicine of Wake Forest College

Clinicopathologic Conference — J. M. Brinkhous, M.D., University of North Carolina School of Medicine, and David Caver, M.D., Bowman Gray School of Medicine of Wake Forest College

"Effect of Lanatoside C on the Circulation of Patients with Congestive Heart Failure. A Study Using the Technique of Right Heart Catheterization"—Eugene A. Stead, Jr., M.D., Duke University School of Medicine

"Recent Advancement in the Treatment of Pulmonary Tuberculosis"—H. Stuart Willis, M.D., Sanatorium

Dr. Hugh J. Morgan, president of the American College of Physicians and dean of the Vanderbilt University School of Medicine, will address the evening meeting.

Through Dr. Robert L. McMillan, program chairman, and Dr. Paul F. Whitaker, district governor of the American College of Physicians, a most cordial invitation is issued to any practicing physician or

surgeon, intern or medical student to attend the scientific session in the afternoon.

News Notes from the University of North Carolina School of Medicine

The following new staff members have been added to the medical faculty:

Dr. H. D. Bruner, formerly assistant professor of pharmacology at the University of Pennsylvania School of Medicine, as professor and head of the Department of Pharmacology. Dr. Bruner received his M.D. degree from the University of Louisville and his Ph.D. in physiology from the University of Chicago. During the war he was a member of a research team on a war gas project at the Harrison Research Surgical Laboratory of the University of Pennsylvania.

Dr. C. T. Kaylor, formerly professor of anatomy at Syracuse University School of Medicine, as associate professor of anatomy.

Dr. DeArmond Moore as instructor in anatomy. Dr. Moore is a native of Charlotte, graduated from the Medical College of Virginia, and recently completed an assistant residency in surgery at the Hospital of the Medical College of Virginia.

Dr. Margaret Swanton as fellow in pathology. Dr. Swanton, an alumna of the Medical School, graduated at Johns Hopkins University School of Medicine in 1946 and interned at the State University of Iowa.

Mr. M. K. Berkut as instructor in biological chemistry and nutrition. He comes to us from the department of chemistry at North Carolina State College.

The following promotions are announced, effective September 1:

Dr. A. V. Jensen from assistant to associate professor of anatomy.

Dr. Fred L. Rights from assistant to associate professor of bacteriology.

* * * *

The North Carolina Division of the American Cancer Society has approved a grant-in-aid of $1500 to the Medical School for assistance in securing speakers on cancer for postgraduate program to be resumed in the winter and spring of 1948.

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Drs. Wm. deB. MacNider, E. M. Hedgpeth, and W. R. Berryhill addressed the September meeting of the Johnston County Medical Society at Micro, North Carolina.

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Dr. A. H. London, president of the University Medical Alumni Association, has appointed the following men as an alumni visiting committee representing all sections of the state to work with the Medical School administration and the Alumni Association in the important planning for the Medical School expansion:

Dr. Henry Temple, Kinston
Dr. A. Bryon Holmes, Fairmont
Dr. Claiborne Smith, Rocky Mount
Dr. Roy McKnight, Charlotte
Dr. Fred Hubbard, North Wilkesboro
Dr. Whitehead McKenzie, Salisbury
Dr. Julian Moore, Asheville
Dr. Zack Owens, Elizabeth City
Dr. Vonnie Hicks, Raleigh
Dr. Ben Royal, Morehead City
Dr. Verne Blackwelder, Lenoir

* * * *

Grants-in-aid from the Fels Fund and the Alamance County General Hospital Fund which have been awarded previously to the Department of Biological Chemistry and Nutrition are being continued during the current academic year.

A grant-in-aid of $3400 has been made to the Department of Pathology by the U. S. Public Health Service to develop a visual education program in the general pathology of neoplasms. This grant was made on the advice of the National Advisory Cancer Council and the North Carolina State Board of Health.

* * * *

Two staff members of the School of Medicine were guests of the Hematology Study Section of the U. S. Public Health Service at a symposium on blood coagulation in Washington, D. C., September 26 and 27. Dr. John H. Ferguson served as chairman of the section on Clotting Factors, and Dr. K. M. Brinkhous served as chairman of the Section on Platelets and Hemophilia.

News Notes from the Bowman Gray School of Medicine of Wake Forest College

On September 19, 1947, formal dedication exercises were held at Graylyn, the Bowman Gray estate in Winston-Salem which has been given to the medical school for use as a rehabilitation and convalescent center. Guest speakers for the occasion were Dr. Arthur H. Ruggles, superintendent of Butler Hospital at Providence, Rhode Island, and organizer of the Department of Psychiatry at Yale University; and Dr. C. C. Burlingame, psychiatrist in chief of the Institute of Living in Hartford, Connecticut and a member of the visiting staff of the College of Physicians and Surgeons in New York.

The principal speaker at the banquet, held at 6:30 p.m. on the same date, was Dr. Winfred Overholser, superintendent of St. Elizabeth's Hospital in Washington, D. C. who is president of the American Psychiatric Association and professor of psychiatry at George Washington School of Medicine.

The convalescent center is being operated by the Department of Neuropsychiatry of the Bowman Gray School of Medicine of Wake Forest College. Dr. Lloyd J. Thompson, professor of neuropsychiatry, is chief of service; and Dr. Douglas M. Kelley, associate professor of neuropsychiatry, is medical director at Graylyn.

* * * *

Dr. Wingate M. Johnson, professor of clinical medicine, has recently been elected to the Board of Trustees of the American Medical Association. He was elected to fill the unexpired term of Dr. Charles W. Roberts, of Atlanta, Georgia, who died in July. Dr. Johnson's book **The Years After Fifty** has recently been published and has won wide acclaim.

* * * *

Dr. Weston M. Kelsey was recently promoted to the position of assistant professor of pediatrics. Dr. Kelsey joined the staff of the Bowman Gray School of Medicine on January 1, 1946, as instructor in pediatrics. He received the degree of Doctor of Medicine from Johns Hopkins University and practiced pediatrics in Westport, Connecticut, prior to entering the Army. He received his discharge in October, 1945, after serving as flight surgeon in the Pacific Theater for three years.

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Announcement of the appointment of Dr. Raymond W. Postlethwait as instructor in surgery was made recently. Dr. Postlethwait, who is a native of New Martinsville, West Virginia, will take up his duties at the medical school on January 1, 1948. He received his education at West Virginia University and Duke University School of Medicine.

Dr. Frank R. Lock, director of the Department of Obstetrics and Gynecology, was chosen as one of the seven specialists throughout the country to be guest speaker at the first annual Postgraduate Assembly of the San Diego County General Hospital in San Diego, California, October 6, 7 and 8. During his stay in California, he also addressed the Regional Obstetrical and Gynecological Society on the subject of "Early Diagnosis and Management of Cervical Cancer."

News Notes from the North Carolina Tuberculosis Association

Mrs. P. P. McCain of Southern Pines and Charles A. Cannon of Concord have been appointed by Governor Cherry to the Board of Directors of the North Carolina Sanatorium. Members who were reappointed to the Board are L. Lee Gravely of Rocky Mount, chairman; Carl Council of Durham; and E. A. Raspberry of Snow Hill.

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The executive committee of the National Conference of Tuberculosis Secretaries has appointed Mrs. C. O. DeLaney, Winston-Salem, chairman of its Advisory Committee on Rehabilitation.

* * * *

The tuberculosis death rate for the United States as a whole showed a drop of 4.2 per 100,000 population in 1946, according to provisional figures issued recently by the Statistical Service of the National Tuberculosis Association.

The 1946 provisional death rate, arrived at through figures supplied by state health departments, is 35.9 per 100,000 as compared with the final figure of 40.1 per 100,000 in 1945. The provisional death rate for North Carolina for the year 1946 is 28.9 as compared with the figure of 31.6 for 1945.

According to the Statistical Service, the sharp drop from 1945 to 1946 is partly due to the fact that 7,566,993 members of the armed forces stationed overseas in 1945 were excluded from the population estimate which served as the base for computing the mortality rate for that year. All but 1,335,287 of these servicemen and women had returned to continental United States by July 1946 and consequently are included in the 1946 population estimate for the country as a whole.

The Duke Symposium

The tenth annual Medical Symposium sponsored by the Duke University School of Medicine and Duke Hospital was held at Duke on October 17 and 18. The subject of the symposium was "Diseases of the Gastro-Intestinal Tract," and the speakers included Dr. Frank C. Mann and Dr. J. Arnold Bargen of Rochester, Minnesota, Dr. Walter L. Palmer of Chicago, Dr. Leon J. Saul of Philadelphia, Dr. Owen H. Wangensteen of Minneapolis, Dr. Henry W. Cave and Dr. Stewart Wolf of New York, Dr. Richard Schatzki of Cambridge, Massachusetts, and Dr. Richard Sweet of Boston.

North Carolina Urological Association

The seventeenth annual meeting of the North Carolina Urological Association was held at Sedgefield Inn on October 5 and 6. Guest speakers were Dr. Robert B. McIver of Jacksonville, Florida, and Dr. Herbert M. Levitt of Columbia, South Carolina. Other speakers were Drs. Robert McKay, Kenneth M. Lynch, Jr., and Aubrey Hawes of Charlotte, Dr. Fred K. Garvey of Winston-Salem, Dr. John Rhodes of Raleigh, and Dr. William M. Coppridge of Durham. Dr. John Frazier of Salisbury is president of the organization.

Edgecombe-Nash Counties Medical Society

The Edgecombe-Nash Counties Medical Society met in Rocky Mount on September 10 to hear the report of the Blood Bank Committee and to discuss phases of the organization and maintenance of a blood bank.

Halifax County Medical Society

The regular monthly dinner and meeting of the Halifax County Medical Society was held in Roanoke Rapids on September 12. Dr. Herman F. Easom, superintendent of the Eastern North Carolina Sanatorium at Wilson, spoke on "Recent Advances in the Treatment of Tuberculosis."

News Notes

Dr. William Seaman Bainbridge of New York, one of the seven honorary members of the Medical Society of the State of North Carolina, died on September 22.

* * * *

The following North Carolina surgeons were accepted into fellowship at the thirty-third convocation of the American College of Surgeons, held in New York on September 12:

Cecil C. Belcher	Asheville
Verne H. Blackwelder	Lenoir
George F. Busby	Salisbury
Dennis B. Fox	Albemarle
H. Fleming Fuller	Kinston
Charles A. Glenn	Gastonia
William F. Hollister	Pinehurst
George W. Paschal, Jr.	Raleigh
F. M. Simmons Patterson	Laurinburg
Edward W. Phifer	Morganton
Warner Lee Wells	Raleigh

* * * *

Dr. J. B. Anderson has announced the reopening of his office in Asheville for the practice of general surgery.

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Dr. Joseph J. Combs of Raleigh has been appointed State College physician, succeeding Dr. A. C. Campbell, who died in June. Dr. Combs will work at the institution on a part-time basis and will maintain his practice in Raleigh.

* * * *

Dr. Charles Welfare has announced the opening of offices for the practice of internal medicine in Winston-Salem.

Corrections for the Roster

The following additional corrections have been received for the roster and alphabetical list of fellows published in the August issue. Any other corrections should be sent to Dr. Roscoe D. McMillan, Red Springs, at once.

Dr. Joseph C. Knox, Wilmington—Specialty should be Pd rather than PH

Dr. R. K. Adams, Morganton—Specialty should be PN rather than P

Dr. Clifton F. West, Kinston—Specialty should be I rather than GP

North Carolina State Nurse's Association

The forty-fifth annual convention of the North Carolina State Nurse's Association and the twenty-ninth annual meeting of the North Carolina League of Nursing Education was held in Asheville on October 15. The convention was preceded by an institute for private duty nurses and a workshop on supervision for public health nursing supervisors on October 13 and 14. Among the speakers at the convention was Dr. H. Stuart Willis, superintendent of the North Carolina sanatoria.

Cancer Seminar

An educational seminar covering the entire field of malignant diseases will be held November 12, 13 and 14, 1947, in the auditorium of the Roosevelt Hotel, Jacksonville, Florida. This seminar is under the auspices of the American Cancer Society, Florida Division, and is being staged by the Tumor Clinic of the Duval County Hospital, Jacksonville, Florida.

The prime purpose of this meeting is to make available to the physicians of the Southeast the latest knowledge in the diagnosis and management of malignant diseases. The American Cancer Society has devoted considerable effort to lay education, and it is hoped that this seminar will provide the counterpart within the medical profession by bringing the most recent information to the physicians so that they may keep abreast of developments in the various fields of malignant diseases. This is the first meeting of this nature to be held in this part of the country, and an open invitation is extended to all physicians who find it possible to attend.

The final roster of speakers is as follows:

1. Dr. Emil Novak, Department of Gynecology, Johns Hopkins Hospital, Baltimore
   Tumors of the Female Genital Tract
2. Dr. Samuel Marshall, Department of Surgery, Lahey Clinic, Boston
   Tumors of the Gastrointestinal Tract
3. Dr. Archie Dean, Chief, Urological Service, Memorial Hospital for the Treatment of Cancer, New York City
   Tumors of the Genito-Urinary Tract
4. Dr. Everett Sugarbaker, Sugarbaker Clinic, Jefferson City, Missouri
   Tumors of the Breast and Lymphomas
5. Dr. George T. Pack, Attending Surgeon in Charge of Mixed Tumor Service, Memorial Hospital for the Treatment of Cancer, New York City
   Mixed Tumors
6. Dr. James Elliott Scarborough, Director, Winship Clinic for Cancer, Emory University Hospital, Atlanta—Tumors of the Head and Neck
7. Dr. Herbert Adams, Department of Surgery, Lahey Clinic, Boston—Tumors of the Chest
8. Dr. R. R. Spencer, Cancer Research Director, National Cancer Institute, Bethesda, Maryland
9. Dr. Everett L. Bishop, Tumor Pathology, Chief Pathologist, Winship Clinic for Cancer, Department of Pathology, Emory University, Atlanta

There will be no registration fee required, all necessary funds being supplied by the American Cancer Society, Florida Division, and the Florida State Board of Health. In the matter of reservations, local hotels will give preference to doctors attending the seminar. Details of the date and time of the various lectures may be obtained from the president of your local medical society.

Medical Society of Virginia

The Medical Society of Virginia held its centennial meeting in Roanoke on October 13, 14, and 15. Officers of the society are Dr. W. L. Powell of Roanoke, president; Dr. Guy R. Fisher of Staunton, president-elect; Drs. A. B. Hodges of Norfolk, Carrington Williams of Richmond, and W. C. Akers of Stuart, vice presidents; and Miss Agnes V. Edwards of Richmond, executive secretary-treasurer.

American Academy of Allergy

The American Academy of Allergy will hold its annual convention at Hotel Jefferson, St. Louis, Missouri, December 15-17 inclusive. All physicians interested in allergic problems are cordially invited to attend the sessions as guests of the Academy by registering without payment of fee. The program, the scientific, and technical exhibits have been arranged to cover a wide variety of conditions where allergic factors may be important. Papers will be presented dealing with the latest methods of diagnosis and treatment as well as the results of investigations and research. Round-table conferences will be held on Monday afternoon, December 15, 1947. Advance copies of the program may be obtained by writing to the Chairman on Arrangements, Charles H. Eyermann, M.D., 634 North Grand Boulevard, St. Louis, Missouri.

American Heart Association

The appointment of Dr. Charles A. R. Connor as medical director of the American Heart Association was announced recently by Dr. Arlie R. Barnes, president of the association.

Dr. Connor succeeds Dr. David D. Rutstein, who recently resigned to take the post of professor of preventive medicine at the Harvard Medical School.

Pan American Medical Women's Alliance

The first Congress of the Pan American Medical Women's Alliance will be held November 17-20 in Mexico City. Women physicians of the Latin American Republics and the United States are cordially invited to attend. Requests for reservations should be addressed to Dr. Guadalupe Alvarez de Acosta, Calz de Piedad No. 47, Mexico, D.F.

National Hearing Week

With three million children in the United States having a hearing loss, and millions of adults already hard of hearing, it is time to conserve hearing, according to Dr. C. Stewart Nash, President of the American Hearing Society, Washington, D. C. The national organization is joined by its 120 local chapters throughout the country in the observance of NATIONAL HEARING WEEK, November 9-15.

"Authorities estimate that one out of every ten persons in America has a hearing loss, ranging from a slight loss to almost total deafness. The social and mental effects of this hearing loss can do much to warp the personality of a growing child, and in addition may prove an effective bar to the child's making a success of later life," said Dr. Nash.

Dr. Nash recommended a vigorous hearing conservation program to be put in effect in the school system of the nation. This includes periodic hearing tests, medical examinations followed by prompt medical attention if any impairment is discovered, and adequate education and rehabilitation for those with a handicapping hearing loss.

Scholar in Medical Science Program Announced by Markle Foundation

An opportunity to start a career in academic medicine is offered to young scientists with the necessary training to hold a regular faculty appointment and to conduct original research through a new program of "post-fellowship" grants, announced by the John and Mary R. Markle Foundation. The purpose of the program, according to John M. Russell, Executive Director of the Foundation, is to attract much-needed talent to academic medicine by giving promising young scientists academic security and financial assistance for a period up to five years. The program will be conducted in cooperation with accredited medical schools in the United States and Canada. Grants of $25,000, payable to the cooperating school at the rate of $5,000 annually for a five-year period toward the support of each successful candidate or his research or both, will be available beginning with the academic year 1948-49. If the plan proves successful, the Foundation will appropriate a total of $1,250,000 to the schools by 1953.

Candidates will be recommended by medical schools and will be limited to young men and women with a particularly strong interest in research and teaching in any of the clinical or pre-clinical sciences or in the sciences basic to medicine. They will have had training in some special field or combination of fields to qualify them to receive a regular faculty appointment and to conduct original research. The final choice will be made, on the basis of the schools' recommendations, by regional committees appointed by the Foundation. The young scientists chosen will be known as "Scholars in Medical Science." No fixed number of Scholars will be appointed in any year, but it is expected that approximately fifty will receive appointments during the five-year period. For each Scholar, the school will determine salary and academic rank, encourage research by setting reasonable limits upon teaching and other non-research activities, provide laboratory facilities, and, if necessary, make a financial contribution toward the support of his work.

The Scholar program is the result of a survey of medical research and education, recently made by the Foundation, which shows that while there are scholarships and other forms of financial aid for the student in the course of his scientific training and while there are funds available to the scientist once his name is made, there are few sources of help at the beginning of the career of the man who chooses academic medicine.

A pamphlet covering the details of the plan has been sent to all deans of accredited medical schools, and persons interested in being considered as candidates are referred to them for further information.

WANTED—INDUSTRIAL PHYSICIAN

Large company. Established Medical Department. 40 hour week. Salary open. Age: up to 40 years.

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(BULLETIN BOARD CONTINUED ON PAGE 686)

AUXILIARY

A MESSAGE FROM THE PRESIDENT

Dear Auxiliary Members:

This year the Auxiliary is planning for its twenty-fifth anniversary. We were organized in 1923 in Asheville, with our beloved Sadie McCain our first president. It is good to look back over these years and remember the fine past presidents, to consider the friendships that our association together has brought, and the service we have been able to render. These have been anxious years and confusing years, for they have seen two depressions, a war, and now an inflation.

Let us in this our twenty-fourth year, facing our twenty-fifth anniversary, take account of ourselves as an organization and renew our purposes and aims. Let us view each proposed activity to determine if it comes within the realm of our reason for being.

The purposes of our organization are, first, to interpret the aims of the medical profession to other organizations interested in the promotion of health education; second, to promote friendliness among the families of the medical profession; and third, to do such work as may be approved from time to time by the Advisory Committee appointed by the Medical Society.

Our long-range project is the maintenance of the McCain, Stevens, and Cooper Sanatoria Beds, and the establishment of a Student Loan Fund. Watch this page for a detailed account of these activities at a later date.

This year Dr. Frank Sharpe, president of the Medical Society of the State of North Carolina, has asked the Auxiliary to cooperate with other interested agencies in the campaign for student nurse recruitment. As part of this campaign Miss Alice Geraldine Maxwell (who is "Miss North Carolina Student Nurse for 1947") is being taken on a speaking tour by the North Carolina State Nurses Association to nine of the largest cities in the state. The auxiliaries in these nine cities are asked to have a tea for Miss Maxwell and Miss Miles, the councilor for the Nurses Association who will be traveling with her, and to invite the superintendents of nurses of the local hospitals and all the young women in the community who may be

interested in entering nurse's training. You will be interested in the schedule of Miss Maxwell's tour. It is as follows:

Fayetteville	Monday, October 20
Wilmington	Tuesday, October 21
Wilson	Thursday, October 23
Raleigh	Friday, October 24
Durham	Monday, October 27
Greensboro	Tuesday, October 28
Winston-Salem	Wednesday, October 29
Asheville	Friday, October 31
Charlotte	Monday, November 3

The fall Board Meeting was held September 30 in Southern Pines at the home of Mrs. P. P. McCain. At that time the Executive Board met with the committee chairmen, the councilors, and the presidents of the county auxiliaries to discuss the year's work. The honor guests for this occasion were Dr. and Mrs. Frank Sharpe and Dr. and Mrs. Roscoe McMillan.

May our 1947-1948 year be a profitable one, and may we enter our twenty-fifth anniversary year with clear vision and renewed dedication to the profession we cherish.

Sincerely yours,

MRS. W. REECE BERRYHILL,
President

BOOK REVIEWS

Skin Manifestations of Internal Disorders. By Kurt Wiener, M.D., Dermatologist, Mount Sinai Hospital, Deaconess Hospital, Saint Michael's Hospital, Milwaukee, Wisconsin. 690 pages. Price, $12.50. St. Louis: The C. V. Mosby Company, 1947.

The author attempts a systematic presentation of the skin manifestations of internal disorders. His purpose is to strengthen the idea that the patient must be studied as a whole and that skin manifestations of disease should not be considered as lying solely within the province of the dermatologist. Relatively minor changes in the skin may serve as the clue to diagnosis of an obscure systemic disease.

The material presented is organized by types of diseases. This organization makes it necessary to have some hint as to the diagnosis before the book can be used for confirmation of the diagnosis; it would be difficult to work back from the skin manifestation toward the diagnosis.

The volume is profusely illustrated, though the quality of the photographs is highly variable. There are six plates in color. An extensive bibliography is conveniently located at the bottom of each page.

The book serves to emphasize the fact that many physiologic processes in most diseases have some external manifestation; for these manifestations the author has coined the term "dermadrome."

The Years After Fifty. By Wingate Johnson, M.D. 153 pages. Price, $2.00. New York: The Whittlesey House, 1947.

At last we have a book that can be recommended with confidence to the older patient. Succeeding where other eminent men have failed, Dr. Johnson has really written for the patient. The language is simple; medical terms, when used, are carefully explained; and the style is a pleasure to read.

The author performs admirably the task of quieting the fears of disease responsible for so much mental misery. On the other hand, he meticulously stresses the gravity of certain conditions without giving the patient morbid ideas of hopelessness. Along with the "thou shalt not" advice inevitable in a book of this type, the author wisely takes up the wide varieties of enticing possibilities which remain open for the older patient.

The descriptions of diseases are concise and brought down to the layman's level of understanding. The types and possibilities of therapy are mentioned in generalities. The book is written in such a manner that it could not be used as a "home guide to diagnosis and treatment." On the contrary, regular and prompt visits to the physician are repeatedly advised.

Along with the physical aspects of aging, the author emphasizes the important mental changes which can make "the years after fifty" a burden or a period of unequalled contentment and a source of inspiration to others. Here he convincingly points out the rewards one receives when the physical attractiveness and prowess of youth are lost. Almost imperceptibly woven into this work is the pointing out of a way of life which makes growing older one of the true pleasures of living.

The book is short (144 reading pages)—an important attribute in a medical work for the laity. Its clear type and dull-finished pages simplify its reading. There are appended an index and a well-selected bibliography which includes recommended books for the physician and layman who wish to delve deeper into the subject.

Upon completion of this book one cannot help feeling grateful to the author for pouring out so generously his own philosophy of life.

Microbial Antagonisms and Antibiotic Substances. By Selman A. Waksman, M.D., Professor of Microbiology, Rutgers University; Microbiologist, New Jersey Agricultural Experiment Station. Ed. 2. 415 pages. Price, $4.00. New York: The Commonwealth Fund, 1947.

The extremely rapid clinical application of antibiotics is one of the miracles of modern medicine. This tremendous new field offers such promise that physicians should be familiar with the fundamental biologic basis for the use of antibiotics. This volume discusses the known facts on antibiotics from the point of view of the fundamental bacteriologic principles involved. The importance of the micro-organisms found in soil is not appreciated by practicing physicians. The author traces the reasoning behind the discovery of antibiotics and their importance not only in the control of human disease but in the control of plant diseases and in the normal growth of plants.

The chemical and biologic properties of the various antibiotics are discussed, and the toxic properties listed. The known antibiotics are listed—and there are an imposing number.

A glossary and an extensive bibliography are appended.

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Signs and Symptoms: Their Clinical Interpretation. Edited by Cyril Mitchell MacBryde, M.D., F.A.C.P., Assistant Professor of Clinical Medicine, Washington University School of Medicine; Assistant Physician, Barnes Hospital, St. Louis, Missouri. 439 pages. Price, $12.50. Philadelphia: J. B. Lippincott Co., 1947.

This work is an enlargement of **The Analysis and Interpretation of Symptoms**, which, in turn, was reprinted from **Clinics** for April, 1944. The original volume contained only ten articles; the present one, twenty-seven, by twenty-one different authors. It covers most of the signs and symptoms commonly encountered in practice. After an introductory chapter by Dr. MacBryde on analyzing and interpreting symptoms, the following subjects are discussed in order: pain, headache, sore tongue and sore mouth, thoracic pain, abdominal pain, backache and back pain, joint pain, pain in the extremities, disturbances of consciousness and of muscle movement, fainting, dyspnea, cyanosis, dehydration, edema, palpitation and tachycardia, cough, hemoptysis, obesity, weight loss and undernutrition, anorexia, nausea and vomiting, constipation and diarrhea, hematemesis and melena, jaundice, itching, and nervousness and fatigue.

The high professional reputation of the authors of these articles assures their soundness. It will be gratifying to North Carolinians to know that one of the best discussions, that on fainting, was contributed by Dr. Eugene Stead, Jr., who succeeded Dr. Fred Hanes as professor of medicine at Duke. Most of the articles are quite easy to read, as well as informative. The illustrations are well chosen and helpful.

No doubt many veterans will be glad to read, in Dr. Vilter's discussion of sore tongue and sore mouth, that the importance of inspecting the tongue "has been re-established in every history and physical examination."

The book can be commended to all who would like to have an authoritative clinical interpretation of the signs and symptoms most often encountered in practice.

The American Illustrated Medical Dictionary—A complete dictionary of the terms used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, Nursing, Veterinary Science, Biology, Medical Biography, etc.; with Pronunciation, Derivation and Definition. By W. A. Newman Dorland, A.M., M.D., F.A.C.S., Lieut Col., M.R.C., U. S. Army; Member Committee on Nomenclature and Classification of Diseases of the A.M.A.; Editor of "American Pocket Medical Dictionary". Ed. 21. 1660 pages, with 880 illustrations, including 233 portraits. Price: $8.00 without thumb index: $8.50 with the thumb index. With the collaboration of E. C. L. Miller, M.D., Medical College of Virginia. Philadelphia and London: W. B. Saunders Company, 1947.

After looking over the twenty-first edition of Dorland's **Dictionary**, this reviewer can only repeat the comment offered in this **Journal's** review of its immediate predecessor, the twentieth edition, which appeared in 1944: "This edition of Dorland's **American Illustrated Medical Dictionary** maintains the eminence which this book has justifiably held in American medical literature. It is by far, in this reviewer's opinion, the best available American medical dictionary . . . To any practitioner not owning a recent edition of this dictionary, the book can be heartily recommended. It should be on the desk of every physician, or on that of his secretary."

Introduction to Medical Psychology. By L. Erwin Wexberg, M.D. 171 pages. Price, $3.50. New York: Grune & Stratton, 1947.

This small book represents a series of lectures given by the author over a period of seven years as an introductory course for sophomores in the subject of "psychology and medicine." The title, "Medical Psychology," is used to emphasize the psychologic side of medical work; it is confusing, however, because the term, "medical psychology," has long been employed as a synonym for psychiatry, particularly abroad.

This confusion inherent in the title carries on through the entire work, and it is difficult in the introduction to differentiate medical psychology from psychiatry. The author discusses first sociologic problems; second, academic psychologic formulations; and third, clinical psychologic techniques. These sections are divided into chapters dealing with the individual and community, knowledge, emotions, temperament, genetic psychology, and the methods of clinical psychology.

If this book were written as an introductory text, it should certainly contain more factual details and fewer generalities. If it were written for lay consumption, it should contain clearer illustrations, more case data, and should be less scattered in structure. Obviously it is not written for anyone with any real knowledge of the subjects concerned.

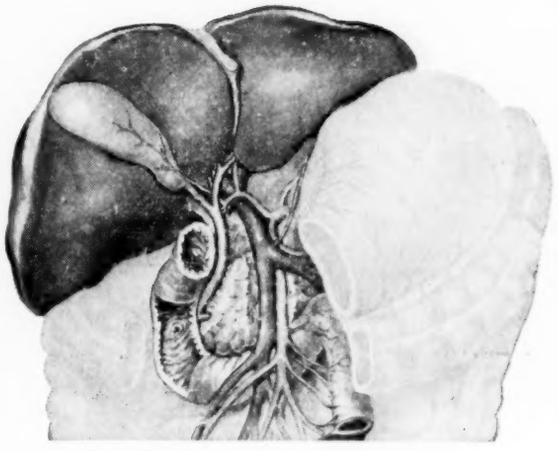
In this book over-simplification has been carried to an extreme. As an outline of lectures wherein the lecturer actually presents the meat of the problem, it may well serve as a scaffold on which the student can build his notes. Without further amplification in the form of lectures, it represents the scaffold standing alone.

New and Nonofficial Remedies—1947. By the Council on Pharmacy and Chemistry of the American Medical Association. 749 pages. Price, $3.00. Philadelphia: J. B. Lippincott Co., 1947.

The Council on Pharmacy and Chemistry, a standing committee appointed by the Board of Trustees of the American Medical Association, publishes yearly this book which contains descriptions of preparations and articles which have been examined and accepted by the Council. The book provides statements on actions, uses, dosages, tests, and standards of the preparations and articles. The book also contains certain official preparations and other articles, including drug substances for manufacturing use, for which there are not official standards, which the Council believes should be included for the information of the medical profession. New preparations are added throughout the year to the volume via the **Journal of the American Medical Association.**

The book should be of great value to practicing physicians, in that it gives information on the newer drugs and limits itself to scientifically investigated preparations. The latter point is one of no little importance in these days of enthusiastic high-pressure detail men.

The hundred-page section on "Tests and Standards" is of little interest to practicing physicians, and in this reviewer's opinion might well be published as a separate supplement available to those interested in this information.



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In Memoriam

ALTON COOK CAMPBELL, M.D.

Dr. Alton Cook Campbell was born in Jonesboro, North Carolina on January 31, 1884. He received his M.D. degree from the University of North Carolina in 1910. Following a ten-month internship at Rex Hospital in Raleigh, he spent a year at the Episcopal Hospital in Philadelphia. He then returned to Raleigh and entered upon the general practice of medicine. With the exception of the time spent as a captain in the army during World War I, he practiced all the time in Raleigh.

Dr. Campbell was connected with the North Carolina State College as college physician for twenty-five years. During this time he treated a multitude of students without a single death. He was instrumental in the growth of the college infirmary from a small thirty-three bed institution to the present four-story modern building with sixty-six bed capacity. He will be sorely missed on the campus of State College.

In June, 1920, he married Miss Elizabeth A. Gailey. This union was blessed with three children, Alton Gailey, Paul Peyton, and Mary Elizabeth. Miss Mary Gailey, his sister-in-law, completed the close-knit family circle which contributed so much to Dr. Campbell's serene and calm manner.

In 1927 he spent three months touring the clinics of Europe. He was a member of the American Medical Association, the Wake County Medical Society, the Raleigh Academy of Medicine, and the staffs of Rex Hospital and St. Agnes Hospital.

In the death of Dr. Campbell the people of Wake County and the medical profession lost a capable, conscientious, hard-working physician. He was a physician in every sense of the word—always mindful of the patient's welfare, available day or night, giving generously of himself and his services.

His loss will be deeply felt by us who have been recipients of his kindness and gentility.

David Kleiman, M.D.
John Rhodes, M.D.

* * * *

FRANK TRUMBO HARPER, M.D.*

WHEREAS, the untimely death of Dr. Frank Trumbo Harper has deprived our society of a distinguished member and our community of a physician who served in an outstanding manner, we his colleagues honor him in this manner.

WHEREAS, during the few brief years he was with us, his untiring fight against tuberculosis accomplished so much in the battle to defeat a disease that must be conquered; and

WHEREAS, though he faithfully administered to the afflictions of so many of our citizens, he always found time to render active service in behalf of many civic projects which he believed essential to the welfare of our community and so especially was this true in his Boy Scout work in this district; and

WHEREAS, by his professional ability and buoyant personality he won and deserved the admiration, love and respect of those with whom he came in contact; therefore, be it

RESOLVED, that we express our sincere sorrow and sympathy to his mother, wife, and children in the loss of a noble son and a devoted husband and father.

2. That a copy of this resolution be spread upon the minutes of our society and further that copies be forwarded to his mother, wife and children, and to the secretary of the North Carolina State Medical Society.

Willard C. Goley, M.D.
Donald E. Robinson, M.D.

* Resolution adopted by the Alamance-Caswell Counties Medical Society.

BULLETIN BOARD

(CONTINUED FROM PAGE 682)

Federal Security Agency

Three new members of the Federal Hospital Council, established last year to assist Surgeon General Thomas Parran of the U. S. Public Health Service in the administration of the hospital survey and construction program, were announced recently by Federal Security Administrator, Oscar R. Ewing.

Nelson Cruikshank, director of social insurance activities of the American Federation of Labor, Washington, was appointed to fill the unexpired term of Clinton S. Golden, also of the A.F. of L., who resigned to serve as labor advisor to the American Mission for Aid to Greece.

Dr. James A. Paullin, professor of clinical medicine, Emory University, Atlanta, Georgia, and former president of the American Medical Association and American College of Physicians, will succeed Mrs. Evelyn Hicks of Birmingham, Alabama, whose one-year term has expired.

Joseph W. Fichter, Master of the Ohio State Grange, Columbus, Ohio, will succeed Melville G. Broughton, former governor of North Carolina, whose appointment has also expired.

Veterans Administration

Another step in the Veterans Administration program to relieve doctors, nurses and technicians of hospital paper work so that they may devote more time to the care of veteran-patients has been ordered by Dr. Paul R. Hawley, chief medical director. Under Dr. Hawley's latest directive, VA hospitals will set up registrars' offices to handle all of the routine paper work that non-professional personnel can process. VA expects this program to aid the agency's objective of giving veteran-patients medical care second to none.

* * * *

Intensive research into heart disease — which claims the lives of more veterans than any other disease—will be centered at the Veterans Administration Mount Alto Hospital in Washington, D. C. The new research center, a part of which already is in operation, was developed under the supervision of Dr. George P. Robb, widely known cardiologist and assistant medical director of the Metropolitan Life Insurance Company. He will continue as consultant to the cardiovascular research unit.

* * * *

Veterans Administration recently announced the beginning of a limited research program into the use of radioactive isotopes for diagnosing and treating certain types of diseases afflicting veterans. Dr. George M. Lyon of Huntington, W. Va., as chief of VA's Radioisotope Section, will be in charge of the program.

Poverty causes illness, and illness, in turn, is a major cause of poverty. This vicious circle has long been recognized. It has also long been appreciated that it may be broken by social-economic measures, income, and living standards, and by medical care competent to lower the incidence and severity of disease.—Medicine in the Changing Order, Rep. N.Y. Acad. Med. Comm., The Commonwealth Fund, 1947.